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中国蹄盖蕨属的研究 Ⅱ——种的处理(1)*

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A REVISION OF THE CHINESE *ATHYRIUM* ROTH Ⅱ ——ENUMERATION OF SPECIES (1)

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Abstract About 300 "species" names of *Athyrium* from China were published. They are preliminarily treated as 117 species with a number of varieties and hybrids. The complete enumeration will be reported in four parts. The present paper is part one, a key to the species.

Key words Taxonomy; Pteridophyte; Athyriaceae; *Athyrium* Roth; China

摘要 已发表的涉及中国的蹄盖蕨属植物的名称有 300 多个,它们初步被处理为 117 种和一些变种和杂种,全文将分 4 次报道,本篇是第一部分:分种检索表。

关键词 分类学;蕨类植物;蹄盖蕨科;蹄盖蕨属;中国

分种检索表

1. 孢子囊群圆形或椭圆形;囊群无盖或盖早消失而不易见;孢子周壁表面有明显的褶皱。
   2. 叶柄及叶轴暗褐色,密被栗黑色或褐棕色、卵状披针形和线形两种混生的鳞片;叶下部羽片多对逐渐缩短,羽片钝头;叶柄远较叶片短(组 1. **黑秆蹄盖蕨组** Sect. 1. **Wallichiana** (X. C. Zhang) Z. R. Wang)。本组仅 1 种,产云南西北部、四川西部和西藏东南部 …………………………………………………… 1. **黑秆蹄盖蕨 A. wallichianum** Ching
   2. 叶柄及叶轴禾秆色或略带淡紫红色,仅在叶柄基部被有较多棕色鳞片;叶下部羽片仅 1~2 对稍缩短,羽片渐尖头;叶柄仅稍短于叶片(组 2. **疏叶蹄盖蕨组** Sect. 2. **Dissitifolia** (X. C. Zhang) Z. R. Wang)。本组有 2 种。
      3. 叶一回羽状,羽片浅裂至深裂,少有二回羽状;羽片无柄或有极短柄(长不及 3 mm);裂片边缘的锯齿短而张开。产湖南、广西、四川、贵州和云南 …………………………………………………… 2. **疏叶蹄盖蕨 A. dissitifolium** (Bak.) C. Chr.
      3. 叶二回羽状;羽片有明显的柄(长可达 10 mm 以上);裂片边缘的锯齿长而斜向上。产云南西北部和西藏 …………………………………………………… 3. **无盖蹄盖蕨 A. exindusiatum** Ching

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关于"蹄盖蕨属的组系划分",见:王中仁,1997. 中国蹄盖蕨属的研究 Ⅰ——属下分类. 植物研究,17(3):235~261
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1. 孢子囊群椭圆、短线、弯钩、马蹄或圆肾等形状;囊群盖宿存,少有残存能见,或至少幼嫩时可见;孢子周壁表面有明显的褶皱或无褶皱。

4. 根状茎细长横走或短横卧;叶远生或近生,或根状茎近直立,但孢子周壁表面有明显的褶皱,羽片无柄,基部上侧不呈耳状。(次项 4 见第 319 页)

5. 根状茎细长横走;羽轴及小羽片中肋上面有长针刺状突起;孢子周壁表面有明显的褶皱或无褶皱。

6. 中型植物,高 20 cm 以上;叶片三回羽状以上分裂;羽轴及小羽轴两侧有狭翅;孢子囊群不紧靠羽轴或小羽轴着生,囊群盖不覆盖羽轴或中肋;孢子周壁有明显的褶皱(组 3. **篦齿蹄盖蕨组** Sect. 3. **Pectinata** (Ching et Y. T. Hsieh) Z. R. Wang)。本组只有一种,产西藏 …………… …………………………………………… 4. **篦齿蹄盖蕨 A. pectinatum** (Wall. ex Mett.) Moore

6. 小型植物,高不及 20 cm;叶片一回羽状,羽片深羽裂;孢子囊群紧靠羽轴或羽裂片中肋着生,囊群盖往往覆盖羽轴或中肋;孢子周壁表面无褶皱。产云南西北部(属于组 14.,亚组 2.,系 2. 方氏蹄盖蕨系) …………………… 100. **秦氏蹄盖蕨 A. chingianum** Z. R. Wang et X. C. Zhang

5. 根状茎长横走或短横卧,或根状茎近直立,但羽片无柄,基部上侧不呈耳状;羽轴及小羽片中肋上面无刺状突起;孢子周壁表面有明显的褶皱(组 4. **日本蹄盖蕨组** Sect. 4. **Niponica** Ching et Y. T. Hsieh)。本组有 4 系。

7. 根状茎细长横走;叶远生(系 1. **苍山蹄盖蕨系** Ser. 1. **Biserrulata** Ching et Y. T. Hsieh)。本系有 3 种。

8. 叶一型,叶柄较叶片短或等长;叶片卵状长圆形;侧生羽片 15~20 对;基部一对羽片缩短,羽轴下侧的裂片和上侧的近等长。

9. 叶片二回羽状,上面无毛;锯齿不为长芒刺状。产四川、云南和西藏 ……………………… ……………………………………………………… 5. **苍山蹄盖蕨 A. biserrulatum** Christ

9. 叶片三回羽状,上面被短柔毛;锯齿有长芒刺。产云南 ……………………………………… ………………………………………………… 6. **乌蒙山蹄盖蕨 A. wumonshanenicum** Ching

8. 叶近二型,不育叶的叶柄较叶片短,能育叶的叶柄远较叶片长;叶片三角状卵形,侧生羽片 3~5 对;基部一对羽片不缩短,羽轴下侧的裂片较上侧的长。产云南 …………………… ……………………………………………………… 7. **瑞丽蹄盖蕨 A. ruilicola** W. M. Chu

7. 根状茎短横卧(偶兼有细长地下匍匐茎);叶近生,或根状茎近直立,但羽片无柄,基部上侧不呈耳状。

10. 叶片卵形至长卵形,顶部急缩,下部羽片仅 1~2 对稍缩短,羽片有柄,叶柄仅稍短于叶片;叶柄基部鳞片淡棕色;孢囊群短线形、长圆形或长弯钩形(系 2. **日本蹄盖蕨系** Ser. 2. **Niponica** Ching et Y. T. Hsieh emend. Z. R. Wang)。本系有 2 种。

11. 羽片通常一回羽状;小羽片卵形、长圆状披针形或镰刀状披针形,边缘浅裂至深裂,基部小羽片通常有短柄。产辽宁、内蒙古、北京、河北、山西、河南、山东、陕西、甘肃、宁夏、湖北、湖南、安徽、江苏、江西、浙江、广西、广东、四川、贵州、云南和台湾…………………… …………………………………………… 8. **日本蹄盖蕨 A. niponicum** (Mett.) Hance

11. 羽片通常羽状深裂至全裂;裂片镰刀状披针形,边缘至多浅裂,基部下延和羽轴的阔翅相连。产云南 ………………… 9. **中缅蹄盖蕨 A. brevisorum** (Wall. ex Hook.) Moore

10. 叶片披针形、长圆状披针形或倒披针形,顶部渐尖,羽片无柄或偶有极短柄(不超过 5 mm);叶柄远较叶片短;叶柄基部鳞片红棕色或栗色;孢子囊群近圆形、椭圆形、圆肾形或短弯钩形。

12. 囊群盖灰白色,边缘具睫毛,叶基部羽片多对逐渐缩短或 1~2 对明显缩短;根状茎短横

卧(系 3. **麦秆蹄盖蕨系** Ser. 3. **Fallaciosa** Z. R. Wang)。本系有 3 种。

13. 羽片的裂片边缘锯齿短钝。产北京、河北、山西、内蒙古、辽宁、吉林、黑龙江、河南、湖北、四川北部、陕西、甘肃和宁夏 ………………………………… 10. **麦秆蹄盖蕨 A. fallaciosum** Milde

13. 羽片的裂片边缘锯齿尖长。

14. 叶轴和羽轴下面无毛。产四川、云南和西藏 …………………………………………………… 11. **岩生蹄盖蕨 A. rupicola** (Edgew ex Hope) C. Chr.

14. 叶轴和羽轴下面被毛。产四川和云南 ……………… 12. **腺毛蹄盖蕨 A. glandulosum** Ching

12. 囊群盖淡棕色,全缘,叶基部羽片不缩短或几不缩短;根状茎近直立(系 4. **禾秆蹄盖蕨系** Ser. 4. **Yokoscentia** Z. R. Wang)。本系有 2 种。

15. 叶柄基部鳞片黄棕色,叶一回羽状羽片深羽裂至二回羽状小羽片浅裂,羽片较窄,披针形。产黑龙江、吉林、辽宁、河南、山东、江苏、浙江、安徽、湖南、江西、四川和贵州……………………………………………………………… 13. **禾秆蹄盖蕨 A. yokoscense** (Franch. et Sav.) Christ

15. 叶柄基部鳞片红褐色中部黑褐色,叶一回羽状羽片浅至深羽裂,羽片宽大,卵形(确切产地待查) ………………………………………………………… 14. **佛瑞蹄盖蕨 A. fauriei** Christ

4. 根状茎直立或斜升,叶簇生。(前项 4 见第 318 页)

16. 羽轴(或小羽轴或中肋)上面无刺状突起,至多在大型植株羽片顶部偶有极短突起,孢子周壁表面有明显的褶皱或无褶皱。(次项 16 见第 321 页)

17. 羽片基部明显增宽,不对称,上侧增大呈耳形,下侧通常楔形;叶片若为一回羽状以上分裂,其裂片或小羽片均为上先出;羽轴上面从无刺状突起;孢子周壁表面有明显的褶皱(偶无褶皱)。(次项 17 见第 320 页)

18. 中型植物,能育叶长在 10 cm 以上,孢子周壁有明显的褶皱(组 5. **耳状蹄盖蕨组** Sect. 5. **Polystichoides** Ching et Y. T. Hsieh emend. Z. R. Wang)。本组有 8 种。

19. 叶片一回羽状,羽片边缘波状或具三角形浅裂片;偶有下部羽片的基部上侧裂片全裂;叶轴被短腺毛。

20. 羽片钝头,基部上侧耳片全缘或略呈波状至粗锯齿,叶轴疏被黑色或褐色短腺毛。产台湾、云南和西藏 ………………………………… 15. **红苞蹄盖蕨 A. nakanoi** Makino

20. 羽片尖头,基部上侧耳片先端有小锯齿,叶轴疏被棕色短腺毛。产贵州西部 ………………………………………………………… 16. **贞丰蹄盖蕨 A. zhenfengense** Ching

19. 叶片一至二回以上羽状分裂,若为一回羽状,羽片之裂片不为三角形;叶轴无短腺毛(偶有淡棕色单细胞短毛)。

21. 叶片卵形至阔卵形,基部一对羽片最大,长卵形,其基部 1～2 对小羽片稍缩短;末回小羽片或裂片钝头。产云南和西藏 ……… 17. **圆囊蹄盖蕨 A. bucahwangense** Ching

21. 叶片狭披针形至卵状披针形,基部一对羽片稍缩短,三角状卵形至三角状披针形,其基部小羽片最大;末回小羽片或裂片尖头或钝圆头。

22. 叶轴上面沟内无腺毛。产台湾 ………… 18. **红柄蹄盖蕨 A. erythropodum** Hayata

22. 叶轴上面沟内有腺毛。

23. 叶厚纸质或近薄革质,暗绿色,表面有光泽;囊群盖较小,孢子囊群成熟时易部分脱落。产四川、贵州、云南、西藏和台湾 ……………………………… 19. **多变蹄盖蕨 A. drepanopterum** (Kunze) A. Br. ex Mett.

23. 叶纸质或草质,绿色,表面无光泽;囊群盖较大,宿存。

24. 叶片一至二回羽状;叶柄禾秆色;基部鳞片棕色或褐棕色;羽片及末回裂片钝圆头;孢子囊群直径 1～2 mm。

25. 叶片通常为披针形，一回羽状，至多基部可达二回羽状，但分离的小羽片不超过5对。产湖南、江西、台湾、广东、广西、四川、贵州、云南和西藏 …… 20. **宿蹄盖蕨 A. anisopterum** Christ

25. 叶片通常为卵状披针形，二回羽状，叶中部羽片的分离小羽片达10对以上。产台湾、云南和西藏 ………………………………… 21. **大盖蹄盖蕨 A. foliolosum** Wall. apud Moore ex Sim

24. 叶片二至三回羽状；叶柄带淡紫红色，基部鳞片红棕色；羽片及末回小羽片尖头；孢子囊群直径不足1 mm。产湖南、四川、云南和西藏 …… 22. **喜马拉雅蹄盖蕨 A. fimbriatum** (Wall.) Moore

18. 小型植物，能育叶长不逾10 cm，孢子周壁表面无褶皱（组6. **小蹄盖蕨组** Sect. 6. **Minima** Z. R. Wang）。本组只有1种，产台湾 ……………………………… 23. **小蹄盖蕨 A. minimum** Ching

17. 羽片基部收缩、不变宽或稍增宽，对称或近对称；至少中部以上羽片的小羽片或裂片下先出或对生；大型植株的羽轴上面偶有极短突起；孢子周壁表面无褶皱。

26. 叶片上面密被短毛（组7. **毛叶蹄盖蕨组** Sect. 7. **Suprapubescentia** Z. R. Wang）。本组有2种。

27. 叶轴和羽轴下面有毛；羽片的裂片钝尖头。产四川金佛山 ………………………………………… 24. **绢毛蹄盖蕨 A. sericellum** Ching

27. 叶轴和羽轴下面无毛；羽片的裂片钝圆头。产四川峨边 ………………………………………… 25. **上毛蹄盖蕨 A. suprapubescens** Ching

26. 叶片无毛。

28. 叶片下部羽片的基部明显收缩；孢子囊群多为短线形；叶轴和羽轴下无毛或被短直腺毛。

29. 叶片三角状卵形，顶端急缩，下部数对羽片近对生，基部一对羽片的羽轴下侧裂片较上侧的长（组8. **海南蹄盖蕨组** Sect. 8. **Hainanensia** Z. R. Wang）。本组只有1种。产海南 …… ……………………………………………… 26. **海南蹄盖蕨 A. hainanense** Ching

29. 叶片披针形或卵状长圆形，顶端渐尖，羽片互生，基部一对羽片的羽轴上下两侧裂片近等长（组9. **裸囊蹄盖蕨组** Sect. 9. **Pachyphylla** Z. R. Wang）。本组有2种。

30. 孢子囊群盖发育不全，仅在幼嫩时可见，裂片边缘的锯齿呈短刺状。产广西、贵州和云南 ……………………………………… 27. **裸囊蹄盖蕨 A. pachyphyllum** Ching

30. 孢子囊群盖完整，宿存，裂片边缘的锯齿不呈短刺状。产云南 ……………………… ……………………………………………… 28. **启无蹄盖蕨 A. wangii** Ching

28. 叶片下部羽片的基稍宽或稍有收缩；孢子囊群多为圆肾形、马蹄形、弯钩或长圆形；叶轴和羽轴下面疏被棘头状（干后呈糠秕状）短腺毛（组10. **蹄盖蕨组** Sect. 10. **Athyrium**）。本组有11种。

31. 叶片阔卵形或卵形，基部仅1～2对羽片稍缩短或几不缩短。分布于我国东北部。

32. 叶柄基部的鳞片黑色、有光泽。产黑龙江和吉林 ………………………………… ……………………………… 29. **黑鳞蹄盖蕨 A. melanolepis** (Franch. et Sav.) Christ

32. 叶柄基部的鳞片棕色或深棕色、无光泽。

33. 植株形体强壮，叶草质，叶柄和叶轴禾秆色或淡紫红色，无光泽。产黑龙江、吉林、辽宁、内蒙古、北京、河北、山西和山东北部 ……………………………………… ………………………… 30. **东北蹄盖蕨 A. brevifrons** Nakai ex Kitagawa

33. 植株形体瘦弱，叶薄草质，叶柄和叶轴淡红色，有光泽。产黑龙江东北部…………… ……………………………………… 31. **黑龙江蹄盖蕨 A. rubripes** (Kom.) Kom.

31. 叶片狭卵形、椭圆状披针形或倒披针形，基部羽片2～3对以上逐渐缩短。产我国华北至西南。

34. 叶片狭卵形，基部2～3对羽片缩短，但基部一对不缩短成耳状。产河北、山西、内蒙古、山东、河南、陕西、甘肃和宁夏 ……………………………………… ………… 32. **中华蹄盖蕨 A. sinense** Rupr.（形似蹄盖蕨 **A. filix-femina** (L.) Roth）

34. 叶片椭圆状披针形或倒披针形，基部 4 对以上羽片逐渐缩短，基部一对往往缩短呈耳状。分布于我国秦岭以南至西藏。

35. 叶柄基部鳞片披针形或线状披针形，宽不逾 1.5 mm，叶一回羽状，羽片深羽裂，裂片边缘有单锯齿，侧脉通常单一。产四川和云南 ……………… 33. **剑叶蹄盖蕨 A. attenuatum** (Clarke) Tagawa

35. 叶柄基部鳞片卵形或三角状卵形，宽可达 3～5 mm，叶通常二回羽状，小羽片边缘浅裂或有重锯齿，侧脉通常有 2～4 个分叉。

36. 叶干后变黑色；叶柄基部鳞片中央栗色，边缘棕色；小羽片先端圆截形。产云南西北部 ………………………………………………………………………… 34. **察陇蹄盖蕨 A. tarulakaense** Ching

36. 叶干后不变黑色；叶柄基部鳞片棕色或暗棕色；小羽片先端钝尖形。

37. 羽片三角状卵形或三角状披针形，长不超过 3～4 cm，彼此接近。产四川和西藏 ………………………………………………………… 35. **短羽蹄盖蕨 A. contigens** Ching et S. K. Wu

37. 羽片线状披针形，长远超过 4 cm，彼此以间隔分开。

38. 侧生羽片有短柄，向基部略收缩，小羽片较长，长可达 2.5～3 cm。产云南 ………………………………………………………………………… 36. **滇西蹄盖蕨 A. nudifrons** Ching

38. 侧生羽片无短柄，向基部不收缩，小羽片长一般不到 2.5～3 cm。

39. 中部羽片宽约 1 cm，互相以较宽的间隔(1 倍羽片宽以上)分开。产甘肃、湖北、四川和云南 ………………………………… 37. **疏羽蹄盖蕨 A. nephrodioides** (Bak.) Christ

39. 中部羽片宽 1 cm 以上，互相以一般间隔(远比羽片窄)分开。

40. 羽片较短、狭，长 3～6 cm，宽不超过 1.8 cm，明显斜向上伸展。产四川 ………………………………………………………… 38. **斜羽蹄盖蕨 A. adscendens** Ching

40. 羽片较长、宽，平展或稍斜展。产甘肃、四川、贵州、云南和西藏 ……………………………… 39. **希陶蹄盖蕨 A. dentigerum** (Wall. ex Clarke) Mehra et Bir

16. 羽轴(或连同小羽轴、中肋)上面或长或短具刺状突起；孢子周壁表面无褶皱。(前项 16 见 319 页)

41. 叶片一回羽状，倒披针形，羽片浅裂至深裂，下部羽片多对逐渐缩短，基部一对羽片往往缩短呈耳形(组 11. **狭基蹄盖蕨组** Sect. 11. **Stenopoda** Z. R. Wang)。本组只有 1 种，产云南和西藏 ……………………………………………………………………… 40. **狭基蹄盖蕨 A. mehrae** Bir

41. 叶片一至三回羽状，不为倒披针形，下部羽片不缩短，或至多一至数对稍缩短，基部一对羽片从不缩短成耳形。

42. 叶片狭披针形，羽片在 20～25 对以上(组 12. **多羽蹄盖蕨组** Sect. 12. **Multipinna** Z. R. Wang)。本组有 2 种。

43. 叶长往往不及 35 cm，一至二回羽状，裂片边缘有张开的宽锯齿，羽片中肋上面的刺状突起极短。产浙江、湖南、江西和贵州 ……………………………………………………………… 41. **多羽蹄盖蕨 A. multipinnum** Y. T. Hsieh et Z. R. Wang

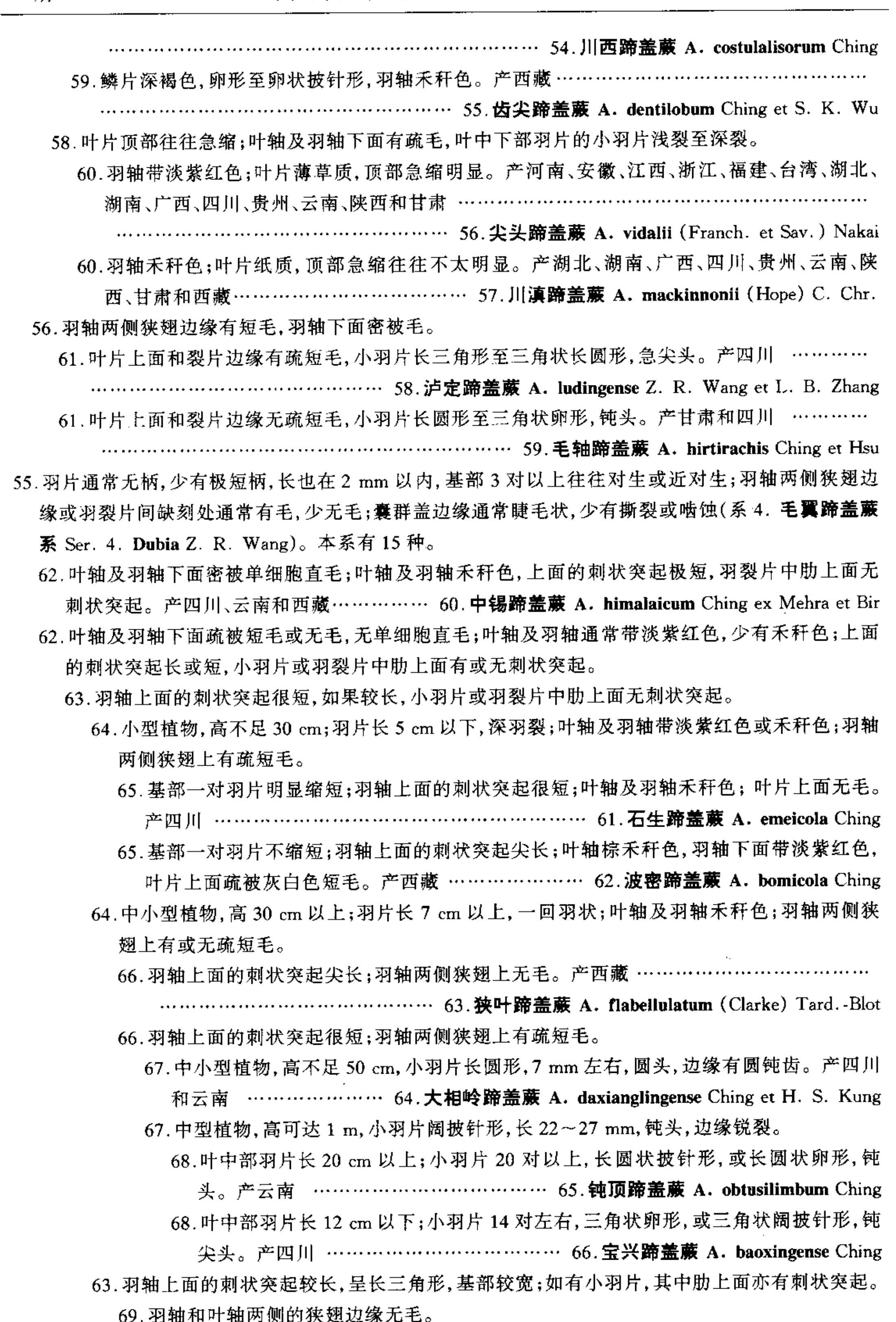
43. 叶长可达 35 cm 上，二回羽状，裂片边缘有向上的细长锯齿，羽轴上面的刺状突起较长。产江西和广西 …………………………………………………… 42. **长叶蹄盖蕨 A. elongatum** Ching

42. 叶片较阔，不为狭披针形，羽片在 20～25 对以下。

44. 囊群盖呈弯钩、马蹄、圆肾、椭圆、短线等多种形状，侧生、横跨或背生于叶脉上；叶柄基部鳞片常为黄棕色、棕色或深棕色(组 13. **川滇蹄盖蕨组** Sect. 13. **Mackinnoniana** (Ching et Y. T. Hsieh) Z. R. Wang)。本组有 4 系。(次项 44 见第 324 页)

45. 叶中部以上羽片之小羽片或羽裂片上先出，偶下先出或近对生，叶轴及羽轴禾秆色，偶有带淡紫红色，下面无毛或具极疏毛；羽轴两侧狭翅边缘或羽裂片间缺刻处无毛(系 1. **湿生蹄盖蕨系** Ser. 1. **Devoliana** Z. R. Wang)。本系有 9 种。

46. 叶中部以上羽片之小羽片或羽裂片上先出,互生,或仅基部一对近对生。
47. 羽片(尤其叶片顶部)或小羽片斜向下反折。
48. 叶片一回羽状,羽片至多羽状深裂,无柄,除顶部的平伸外,全部向下弯弓。产台湾 ……………………………………………………………… 43. **逆叶蹄盖蕨 A. reflexipinnum** Hayata
48. 叶片一至二回羽状,羽片有短柄,通常平伸或斜向上,顶部的向下弯弓;小羽片可达羽状全裂,斜向下或平伸。
49. 孢子囊群马蹄形,小羽片披针形,几无柄。产浙江、福建、江西、广西、四川、贵州、云南和西藏 ………………………………………………………… 44. **湿生蹄盖蕨 A. devolii** Ching
49. 孢子囊群长圆形或弯钩形,小羽片卵状三角形或长圆形,有明显柄或基部以狭翅和羽轴相连。
50. 小羽片卵状三角形,急尖头,有明显柄(长约 1 mm)。产浙江庆元 ……………………………………………… 45. **百山祖蹄盖蕨 A. baishanzuense** Ching et Y. T. Hsieh
50. 小羽片长圆形,圆钝头,基部以狭翅和羽轴相连。产浙江昴山 ……………………………………………… 46. **昴山蹄盖蕨 A. maoshanense** Ching et P. S. Chiu
47. 羽片(尤其叶片顶部)或小羽片向上伸展或至多近平伸。
51. 叶下部羽片互生,至多基部一对近对生;叶轴和羽轴带淡紫红色,上面刺状突起明显,小羽片中肋上面无刺状突起。产台湾 ………………………… 47. **三回蹄盖蕨 A. tripinnatum** Tagawa
51. 叶基部一至多对羽片对生或近对生;叶轴和羽轴禾秆色,上面的刺状突起极短,小羽片中肋上面亦有极短刺状突起。
52. 羽片之基部一对小羽片近对生,叶轴和羽轴下面疏被短柔毛。产浙江、福建、江西、湖南、四川和贵州 ………………………………………… 48. **溪边蹄盖蕨 A. deltoidofrons** Makino
52. 羽片之小羽片上先出,叶轴和羽轴下面光滑无毛。产广西、四川、贵州、云南和西藏 ……………………………………………… 49. **薄叶蹄盖蕨 A. delicatulum** Ching et S. K. Wu
46. 叶片中部以上的羽片之小羽片或羽裂片对生或近对生。
53. 小羽片或羽裂片向下反折或略平展。产台湾 ……… 50. **对生蹄盖蕨 A. oppositipinnum** Hayata
53. 小羽片或羽裂片平展。产四川 ………………………………… 51. **粗柄蹄盖蕨 A. crassipes** Ching
45. 叶中部以上羽片之小羽片或羽裂片下先出或近对生;叶轴及羽轴通常带淡紫红色,少有禾秆色,下面有毛;羽轴两侧狭翅边缘或羽裂片间缺刻处有毛或无毛。
54. 囊群盖通常为肾形、圆肾或椭圆形;叶片阔卵形,基部一对羽片最大,顶部渐尖;鳞片黄棕色(系 2. **峨嵋蹄盖蕨系** Ser. 2. **Omeiensia** Z. R. Wang)。本系只有 1 种。产湖北、湖南、陕西、甘肃、四川和云南 ………………………………………………………… 52. **峨嵋蹄盖蕨 A. omeiense** Ching
54. 囊群盖通常为长圆、弯钩或马蹄形;叶片通常为长圆状卵形,顶部急缩或渐尖,基部一对羽片和第二对羽片近等大或稍大;鳞片棕色或褐棕色。
55. 羽片有明显的柄,长一般在 2 mm 以上,除基部一对近对生以外,皆为互生;羽轴两侧狭翅边缘或羽裂片间缺刻处无毛,罕有毛;囊群盖边缘近全缘或啮蚀状(系 3. **川滇蹄盖蕨系** Ser. 3. **Mackinnoniana** Z. R. Wang)。本系有 7 种。
56. 羽轴两侧狭翅边缘无毛,叶轴及羽轴无毛或疏被毛。
57. 小羽片长圆形,圆钝头。产浙江和安徽 ……………………………………………… 53. **中间蹄盖蕨 A. intermixtum** Ching et P. S. Chiu
57. 小羽片卵形至长圆状披针形,尖头。
58. 叶片顶部通常为渐尖;叶轴及羽轴下面无毛,叶中下部羽片的小羽片深裂至全裂。
59. 鳞片淡棕色,线状披针形,羽轴下面带淡紫红色。产四川 ……………………………



…………………………………………………… 54.川西蹄盖蕨 **A. costulalisorum** Ching

59.鳞片深褐色,卵形至卵状披针形,羽轴禾秆色。产西藏 ……………………………………

…………………………………………… 55.齿尖蹄盖蕨 **A. dentilobum** Ching et S. K. Wu

58.叶片顶部往往急缩;叶轴及羽轴下面有疏毛,叶中下部羽片的小羽片浅裂至深裂。

60.羽轴带淡紫红色;叶片薄草质,顶部急缩明显。产河南、安徽、江西、浙江、福建、台湾、湖北、湖南、广西、四川、贵州、云南、陕西和甘肃 ……………………………………………………

…………………………………………… 56.尖头蹄盖蕨 **A. vidalii** (Franch. et Sav.) Nakai

60.羽轴禾秆色;叶片纸质,顶部急缩往往不太明显。产湖北、湖南、广西、四川、贵州、云南、陕西、甘肃和西藏 …………………………… 57.川滇蹄盖蕨 **A. mackinnonii** (Hope) C. Chr.

56.羽轴两侧狭翅边缘有短毛,羽轴下面密被毛。

61.叶片上面和裂片边缘有疏短毛,小羽片长三角形至三角状长圆形,急尖头。产四川 …………

……………………………………… 58.泸定蹄盖蕨 **A. ludingense** Z. R. Wang et L. B. Zhang

61.叶片上面和裂片边缘无疏短毛,小羽片长圆形至三角状卵形,钝头。产甘肃和四川 …………

…………………………………………………… 59.毛轴蹄盖蕨 **A. hirtirachis** Ching et Hsu

55.羽片通常无柄,少有极短柄,长也在 2 mm 以内,基部 3 对以上往往对生或近对生;羽轴两侧狭翅边缘或羽裂片间缺刻处通常有毛,少无毛;囊群盖边缘通常睫毛状,少有撕裂或啮蚀(系 4. **毛翼蹄盖蕨系** Ser. 4. **Dubia** Z. R. Wang)。本系有 15 种。

62.叶轴及羽轴下面密被单细胞直毛;叶轴及羽轴禾秆色,上面的刺状突起极短,羽裂片中肋上面无刺状突起。产四川、云南和西藏 ………… 60.中锡蹄盖蕨 **A. himalaicum** Ching ex Mehra et Bir

62.叶轴及羽轴下面疏被短毛或无毛,无单细胞直毛;叶轴及羽轴通常带淡紫红色,少有禾秆色;上面的刺状突起长或短,小羽片或羽裂片中肋上面有或无刺状突起。

63.羽轴上面的刺状突起很短,如果较长,小羽片或羽裂片中肋上面无刺状突起。

64.小型植物,高不足 30 cm;羽片长 5 cm 以下,深羽裂;叶轴及羽轴带淡紫红色或禾秆色;羽轴两侧狭翅上有疏短毛。

65.基部一对羽片明显缩短;羽轴上面的刺状突起很短;叶轴及羽轴禾秆色;叶片上面无毛。产四川 ………………………………………… 61.石生蹄盖蕨 **A. emeicola** Ching

65.基部一对羽片不缩短;羽轴上面的刺状突起尖长;叶轴棕禾秆色,羽轴下面带淡紫红色,叶片上面疏被灰白色短毛。产西藏 ………………… 62.波密蹄盖蕨 **A. bomicola** Ching

64.中小型植物,高 30 cm 以上;羽片长 7 cm 以上,一回羽状;叶轴及羽轴禾秆色;羽轴两侧狭翅上有或无疏短毛。

66.羽轴上面的刺状突起尖长;羽轴两侧狭翅上无毛。产西藏 ……………………………

……………………………… 63.狭叶蹄盖蕨 **A. flabellulatum** (Clarke) Tard.-Blot

66.羽轴上面的刺状突起很短;羽轴两侧狭翅上有疏短毛。

67.中小型植物,高不足 50 cm,小羽片长圆形,7 mm 左右,圆头,边缘有圆钝齿。产四川和云南 ……………… 64.大相岭蹄盖蕨 **A. daxianglingense** Ching et H. S. Kung

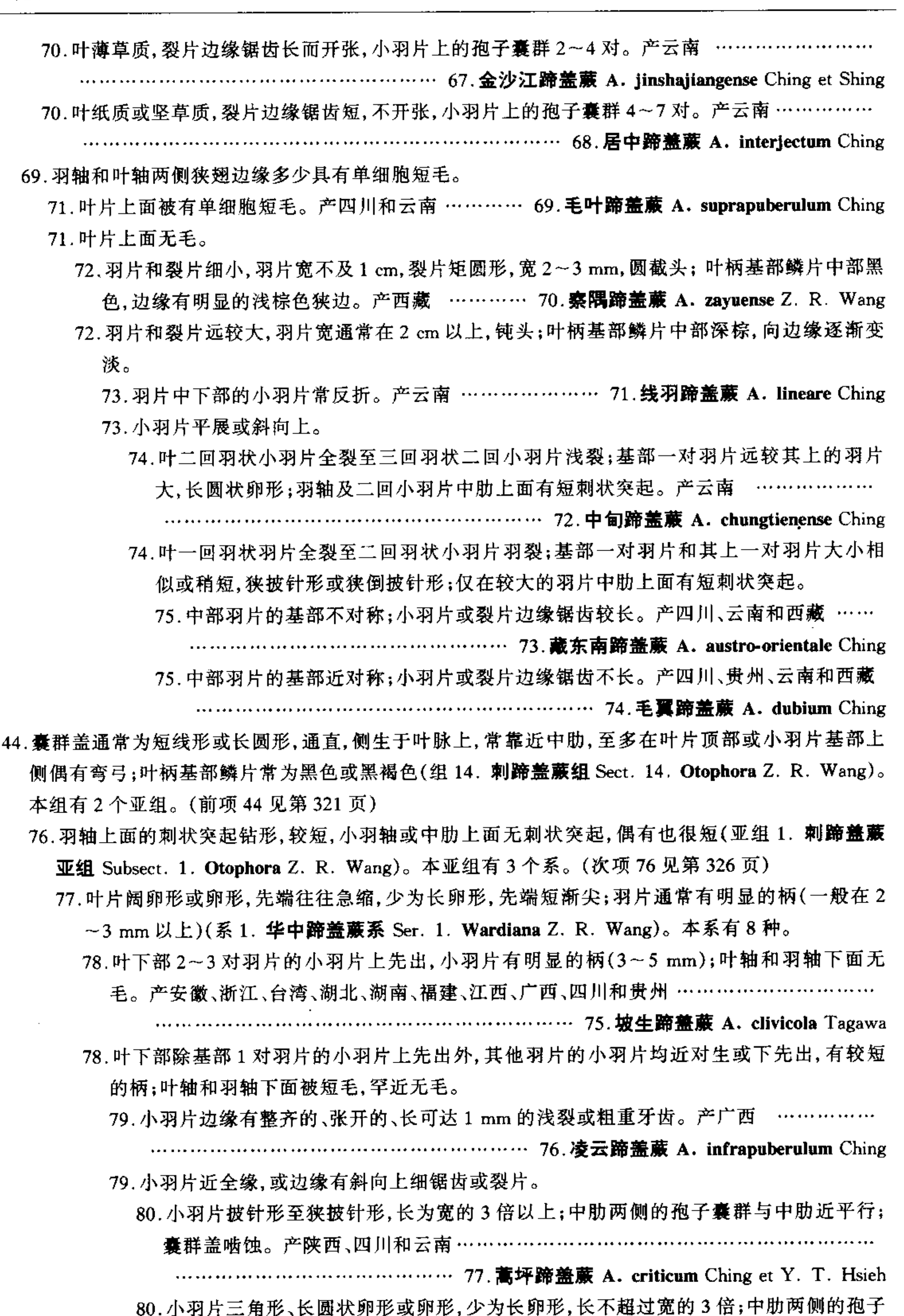
67.中型植物,高可达 1 m,小羽片阔披针形,长 22～27 mm,钝头,边缘锐裂。

68.叶中部羽片长 20 cm 以上;小羽片 20 对以上,长圆状披针形,或长圆状卵形,钝头。产云南 …………………………… 65.钝顶蹄盖蕨 **A. obtusilimbum** Ching

68.叶中部羽片长 12 cm 以下;小羽片 14 对左右,三角状卵形,或三角状阔披针形,钝尖头。产四川 ………………………… 66.宝兴蹄盖蕨 **A. baoxingense** Ching

63.羽轴上面的刺状突起较长,呈长三角形,基部较宽;如有小羽片,其中肋上面亦有刺状突起。

69.羽轴和叶轴两侧的狭翅边缘无毛。



70. 叶薄草质,裂片边缘锯齿长而开张,小羽片上的孢子囊群 2～4 对。产云南 …………………………………………………………………… 67. **金沙江蹄盖蕨 A. jinshajiangense** Ching et Shing

70. 叶纸质或坚草质,裂片边缘锯齿短,不开张,小羽片上的孢子囊群 4～7 对。产云南 …………………………………………………………………………… 68. **居中蹄盖蕨 A. interjectum** Ching

69. 羽轴和叶轴两侧狭翅边缘多少具有单细胞短毛。

71. 叶片上面被有单细胞短毛。产四川和云南 ………… 69. **毛叶蹄盖蕨 A. suprapuberulum** Ching

71. 叶片上面无毛。

72. 羽片和裂片细小,羽片宽不及 1 cm,裂片矩圆形,宽 2～3 mm,圆截头;叶柄基部鳞片中部黑色,边缘有明显的浅棕色狭边。产西藏 ………… 70. **察隅蹄盖蕨 A. zayuense** Z. R. Wang

72. 羽片和裂片远较大,羽片宽通常在 2 cm 以上,钝头;叶柄基部鳞片中部深棕,向边缘逐渐变淡。

73. 羽片中下部的小羽片常反折。产云南 ………………… 71. **线羽蹄盖蕨 A. lineare** Ching

73. 小羽片平展或斜向上。

74. 叶二回羽状小羽片全裂至三回羽状二回小羽片浅裂;基部一对羽片远较其上的羽片大,长圆状卵形;羽轴及二回小羽片中肋上面有短刺状突起。产云南 ………………………………………………………………… 72. **中甸蹄盖蕨 A. chungtienense** Ching

74. 叶一回羽状羽片全裂至二回羽状小羽片羽裂;基部一对羽片和其上一对羽片大小相似或稍短,狭披针形或狭倒披针形;仅在较大的羽片中肋上面有短刺状突起。

75. 中部羽片的基部不对称;小羽片或裂片边缘锯齿较长。产四川、云南和西藏 ……………………………………………… 73. **藏东南蹄盖蕨 A. austro-orientale** Ching

75. 中部羽片的基部近对称;小羽片或裂片边缘锯齿不长。产四川、贵州、云南和西藏 ……………………………………………………………… 74. **毛翼蹄盖蕨 A. dubium** Ching

44. 囊群盖通常为短线形或长圆形,通直,侧生于叶脉上,常靠近中肋,至多在叶片顶部或小羽片基部上侧偶有弯弓;叶柄基部鳞片常为黑色或黑褐色(组 14. **刺蹄盖蕨组** Sect. 14. **Otophora** Z. R. Wang)。本组有 2 个亚组。(前项 44 见第 321 页)

76. 羽轴上面的刺状突起钻形,较短,小羽轴或中肋上面无刺状突起,偶有也很短(亚组 1. **刺蹄盖蕨亚组** Subsect. 1. **Otophora** Z. R. Wang)。本亚组有 3 个系。(次项 76 见第 326 页)

77. 叶片阔卵形或卵形,先端往往急缩,少为长卵形,先端短渐尖;羽片通常有明显的柄(一般在 2～3 mm 以上)(系 1. **华中蹄盖蕨系** Ser. 1. **Wardiana** Z. R. Wang)。本系有 8 种。

78. 叶下部 2～3 对羽片的小羽片上先出,小羽片有明显的柄(3～5 mm);叶轴和羽轴下面无毛。产安徽、浙江、台湾、湖北、湖南、福建、江西、广西、四川和贵州 ……………………………………………………………………… 75. **坡生蹄盖蕨 A. clivicola** Tagawa

78. 叶下部除基部 1 对羽片的小羽片上先出外,其他羽片的小羽片均近对生或下先出,有较短的柄;叶轴和羽轴下面被短毛,罕近无毛。

79. 小羽片边缘有整齐的、张开的、长可达 1 mm 的浅裂或粗重牙齿。产广西 ……………………………………………………………… 76. **凌云蹄盖蕨 A. infrapuberulum** Ching

79. 小羽片近全缘,或边缘有斜向上细锯齿或裂片。

80. 小羽片披针形至狭披针形,长为宽的 3 倍以上;中肋两侧的孢子囊群与中肋近平行;囊群盖啮蚀。产陕西、四川和云南 …………………………………………………………………………………… 77. **蒿坪蹄盖蕨 A. criticum** Ching et Y. T. Hsieh

80. 小羽片三角形、长圆状卵形或卵形,少为长卵形,长不超过宽的 3 倍;中肋两侧的孢子囊群不与中肋平行;囊群盖全缘或近全缘。

81. 叶片三角形或三角状卵形,除顶部急缩的羽片以外有羽片 5 对左右;小羽片较阔,中部宽通常在 5 mm 以上,边缘有锯齿;羽轴下面密被短毛。

82. 叶基部一对羽片的基部最宽,其下部小羽片最大;小羽片基部两侧呈耳状。产湖南和贵州 ……………… 78. **长柄蹄盖蕨 A. longius** Ching

82. 叶基部一对羽片的下部小羽片缩短;小羽片基部上侧呈耳状。

83. 中部羽片的小羽片斜长方形,边缘仅有细锯齿。产浙江、安徽、福建、江西、湖南、湖北、广西、四川、贵州和云南 ……………… 79. **华中蹄盖蕨 A. wardii** (Hook.) Makino

83. 中部羽片的小羽片三角状阔披针形,边缘浅裂至中裂。产湖北……………… 80. **粗脉蹄盖蕨 A. venulosum** Ching

81. 叶片狭三角状卵形、长卵形或卵形,除顶部急缩的羽片以外有羽片 7 对以上;小羽片较狭,中部宽通常在 5 mm 以下,近全缘;羽轴下面疏被短毛。

84. 叶卵状长圆形,先端急缩;羽片较长(可达 18 cm),有分离小羽片 10 对以上。产湖南、湖北、陕西、四川和贵州 ……………… 81. **短柄蹄盖蕨 A. brevistipes** Ching

84. 叶狭三角状卵形,顶端渐尖;羽片较短(5～9 mm),有分离小羽片 10 对以下。产广西、广东和四川 ……………… 82. **紫柄蹄盖蕨 A. kenzo-satakei** Kurata

77. 叶片长圆状卵形或披针形,少有卵形,先端渐尖,少有急缩;羽片通常无柄,或有极短柄(长不及 2 mm)。

85. 小羽片或裂片圆钝头或截头,边缘有圆形浅裂片或波状齿;中肋两边囊群之间的间隔通常宽于囊群到叶边缘的距离(系 2. **中越蹄盖蕨系** Ser. 2. **Christenseniana** Z. R. Wang)。本系只有 1 种,产广西和云南 ……………… 83. **中越蹄盖蕨 A. christensenii** (Tard.-Blot) Ching

85. 小羽片或裂片尖头或钝尖头,边缘裂片或锯齿不为圆形波状;中肋两边囊群之间的间隔通常窄于囊群到叶边缘的距离(系 3. **刺蹄盖蕨系** Ser. 3. **Otophora** Z. R. Wang)。本系有 13 种。

86. 羽片基部一对小羽片覆盖叶轴。

87. 羽片渐尖头;小羽片钝头,边缘锯齿张开。产广西、四川、贵州和云南 ……………… 84. **翅轴蹄盖蕨 A. delavayi** Christ

87. 羽片尾状渐尖头;小羽片尖头或钝尖头,边缘锯齿斜向上。

88. 羽片较长(14～16 cm),顶部尾状长渐尖;小羽片短渐尖头,基部上侧有较长的耳状突起,中肋上面无刺状突起。产四川和湖南………… 85. **长尾蹄盖蕨 A. caudiforme** Ching

88. 羽片较短(10～12 cm),顶部短尾状;小羽片尖头,基部上侧耳状突起圆头较短,中肋上面有刺状突起。产台湾 ………… 86. **姬蹄盖蕨 A. subrigescens** (Hayata) Hayata ex Ito

86. 羽片基部一对小羽片不覆盖叶轴。

89. 叶柄基部的鳞片卵状披针形或披针形;中部以上羽片之小羽片上先出或近对生;孢子囊群较短(长 1 mm 左右),贴近中肋着生,几与中肋平行。产云南 ……………… 87. **林光蹄盖蕨 A. decorum** Ching

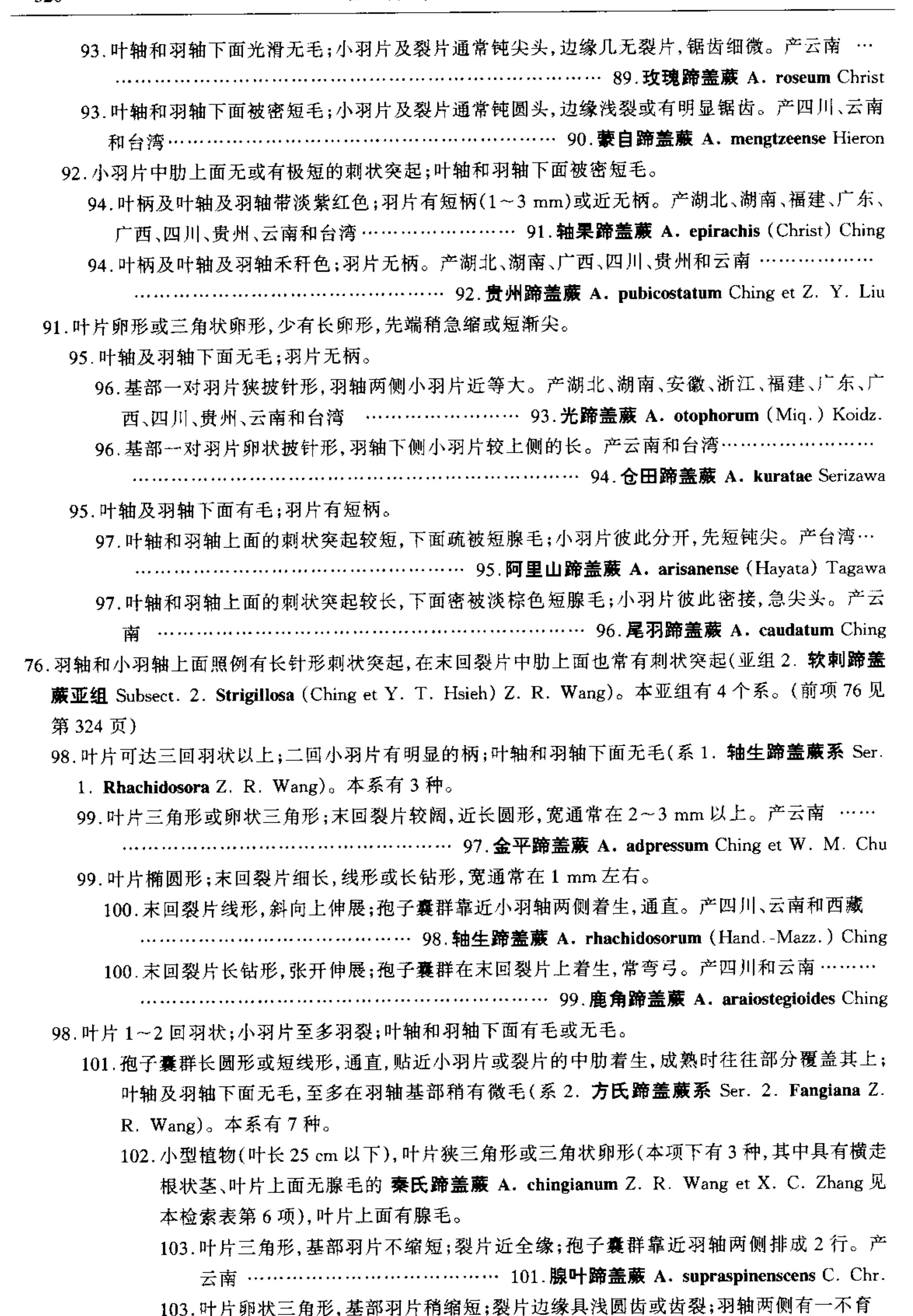
89. 叶柄基部的鳞片线形至线状披针形;中部以上羽片之小羽片下先出或近对生;孢子囊群较长(长 1.5 mm 以上),在羽片或小羽片上呈八字形排列。

90. 羽片往往有短柄;小羽片狭长圆形,基部阔楔形;羽轴及叶轴顶部上面的刺状突起极短。产云南 ……………… 88. **同形蹄盖蕨 A. uniforme** Ching

90. 羽片无柄或有极短柄;小羽片不为狭长圆形,基部下侧楔形,上侧截形和羽轴平行;羽轴及叶轴顶部上面的刺状突起明显。

91. 叶片狭卵形或披针形,先端渐尖。

92. 小羽片中肋上面有明显的刺状突起;叶轴和羽轴下面被密短毛或无毛。



93.叶轴和羽轴下面光滑无毛;小羽片及裂片通常钝尖头,边缘几无裂片,锯齿细微。产云南 …………………………………………………………………………… 89.**玫瑰蹄盖蕨 A. roseum** Christ

93.叶轴和羽轴下面被密短毛;小羽片及裂片通常钝圆头,边缘浅裂或有明显锯齿。产四川、云南和台湾 ……………………………………………………………… 90.**蒙自蹄盖蕨 A. mengtzeense** Hieron

92.小羽片中肋上面无或有极短的刺状突起;叶轴和羽轴下面被密短毛。

94.叶柄及叶轴及羽轴带淡紫红色;羽片有短柄(1~3 mm)或近无柄。产湖北、湖南、福建、广东、广西、四川、贵州、云南和台湾 …………………… 91.**轴果蹄盖蕨 A. epirachis** (Christ) Ching

94.叶柄及叶轴及羽轴禾秆色;羽片无柄。产湖北、湖南、广西、四川、贵州和云南 ………………………………………………………… 92.**贵州蹄盖蕨 A. pubicostatum** Ching et Z. Y. Liu

91.叶片卵形或三角状卵形,少有长卵形,先端稍急缩或短渐尖。

95.叶轴及羽轴下面无毛;羽片无柄。

96.基部一对羽片狭披针形,羽轴两侧小羽片近等大。产湖北、湖南、安徽、浙江、福建、广东、广西、四川、贵州、云南和台湾 …………………… 93.**光蹄盖蕨 A. otophorum** (Miq.) Koidz.

96.基部一对羽片卵状披针形,羽轴下侧小羽片较上侧的长。产云南和台湾…………………………………………………………………………… 94.**仓田蹄盖蕨 A. kuratae** Serizawa

95.叶轴及羽轴下面有毛;羽片有短柄。

97.叶轴和羽轴上面的刺状突起较短,下面疏被短腺毛;小羽片彼此分开,先短钝尖。产台湾……………………………………………………… 95.**阿里山蹄盖蕨 A. arisanense** (Hayata) Tagawa

97.叶轴和羽轴上面的刺状突起较长,下面密被淡棕色短腺毛;小羽片彼此密接,急尖头。产云南 …………………………………………………………… 96.**尾羽蹄盖蕨 A. caudatum** Ching

76.羽轴和小羽轴上面照例有长针形刺状突起,在末回裂片中肋上面也常有刺状突起(亚组 2. **软刺蹄盖蕨亚组** Subsect. 2. **Strigillosa** (Ching et Y. T. Hsieh) Z. R. Wang)。本亚组有 4 个系。(前项 76 见第 324 页)

98.叶片可达三回羽状以上;二回小羽片有明显的柄;叶轴和羽轴下面无毛(系 1. **轴生蹄盖蕨系** Ser. 1. **Rhachidosora** Z. R. Wang)。本系有 3 种。

99.叶片三角形或卵状三角形;末回裂片较阔,近长圆形,宽通常在 2~3 mm 以上。产云南 ………………………………………………………… 97.**金平蹄盖蕨 A. adpressum** Ching et W. M. Chu

99.叶片椭圆形;末回裂片细长,线形或长钻形,宽通常在 1 mm 左右。

100.末回裂片线形,斜向上伸展;孢子囊群靠近小羽轴两侧着生,通直。产四川、云南和西藏 …………………………………… 98.**轴生蹄盖蕨 A. rhachidosorum** (Hand.-Mazz.) Ching

100.末回裂片长钻形,张开伸展;孢子囊群在末回裂片上着生,常弯弓。产四川和云南 ………………………………………………………… 99.**鹿角蹄盖蕨 A. araiostegioides** Ching

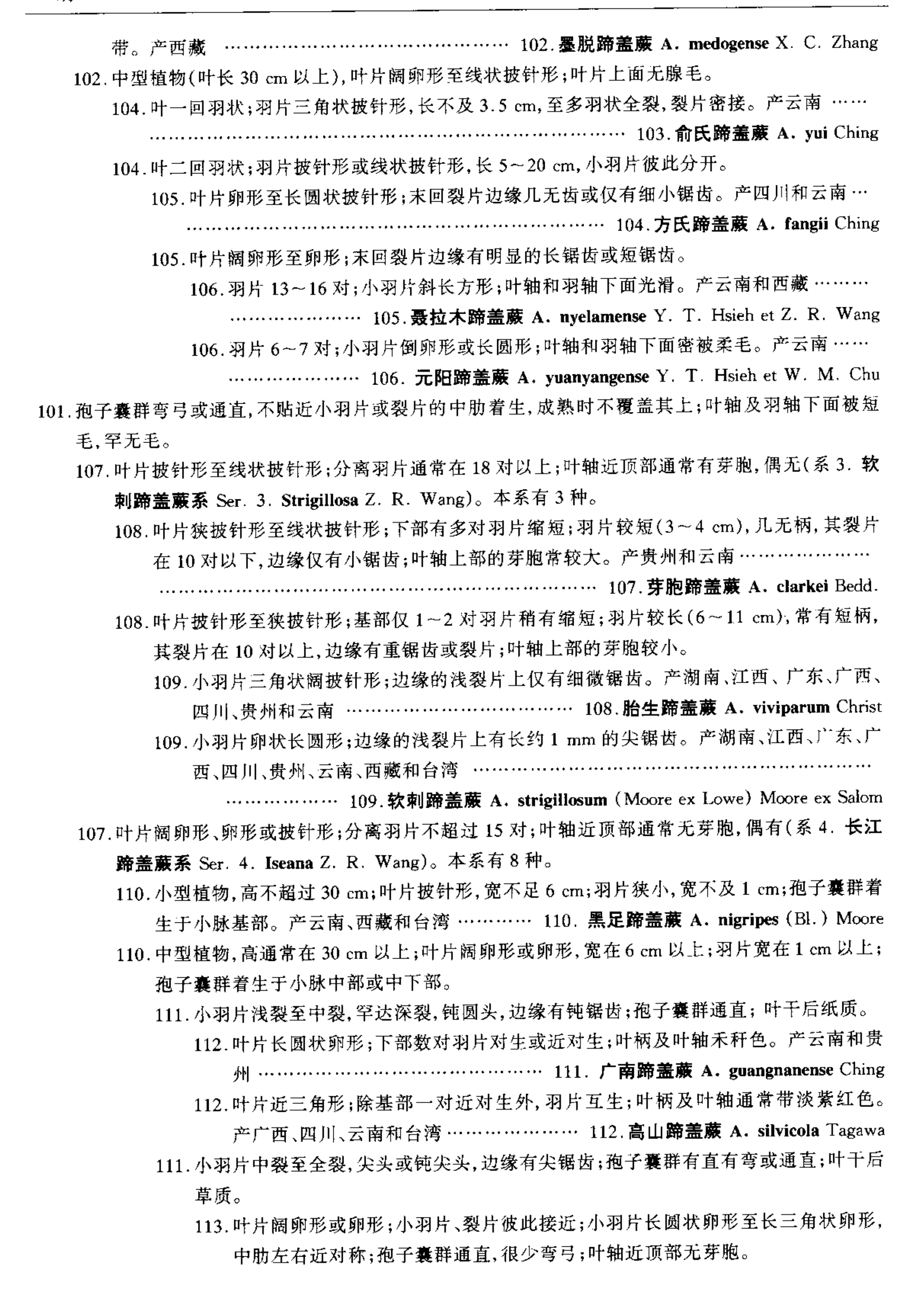
98.叶片 1~2 回羽状;小羽片至多羽裂;叶轴和羽轴下面有毛或无毛。

101.孢子囊群长圆形或短线形,通直,贴近小羽片或裂片的中肋着生,成熟时往往部分覆盖其上;叶轴及羽轴下面无毛,至多在羽轴基部稍有微毛(系 2. **方氏蹄盖蕨系** Ser. 2. **Fangiana** Z. R. Wang)。本系有 7 种。

102.小型植物(叶长 25 cm 以下),叶片狭三角形或三角状卵形(本项下有 3 种,其中具有横走根状茎、叶片上面无腺毛的 **秦氏蹄盖蕨 A. chingianum** Z. R. Wang et X. C. Zhang 见本检索表第 6 项),叶片上面有腺毛。

103.叶片三角形,基部羽片不缩短;裂片近全缘;孢子囊群靠近羽轴两侧排成 2 行。产云南 …………………………………… 101.**腺叶蹄盖蕨 A. supraspinenscens** C. Chr.

103.叶片卵状三角形,基部羽片稍缩短;裂片边缘具浅圆齿或齿裂;羽轴两侧有一不育



带。产西藏 …………………………………… 102.**墨脱蹄盖蕨 A. medogense** X. C. Zhang

102.中型植物(叶长 30 cm 以上),叶片阔卵形至线状披针形;叶片上面无腺毛。

104.叶一回羽状;羽片三角状披针形,长不及 3.5 cm,至多羽状全裂,裂片密接。产云南 …… …………………………………… 103.**俞氏蹄盖蕨 A. yui** Ching

104.叶二回羽状;羽片披针形或线状披针形,长 5~20 cm,小羽片彼此分开。

105.叶片卵形至长圆状披针形;末回裂片边缘几无齿或仅有细小锯齿。产四川和云南 … …………………………………… 104.**方氏蹄盖蕨 A. fangii** Ching

105.叶片阔卵形至卵形;末回裂片边缘有明显的长锯齿或短锯齿。

106.羽片 13~16 对;小羽片斜长方形;叶轴和羽轴下面光滑。产云南和西藏 ……… ………………… 105.**聂拉木蹄盖蕨 A. nyelamense** Y. T. Hsieh et Z. R. Wang

106.羽片 6~7 对;小羽片倒卵形或长圆形;叶轴和羽轴下面密被柔毛。产云南 …… ………………… 106.**元阳蹄盖蕨 A. yuanyangense** Y. T. Hsieh et W. M. Chu

101.孢子囊群弯弓或通直,不贴近小羽片或裂片的中肋着生,成熟时不覆盖其上;叶轴及羽轴下面被短毛,罕无毛。

107.叶片披针形至线状披针形;分离羽片通常在 18 对以上;叶轴近顶部通常有芽胞,偶无(系 3. **软刺蹄盖蕨系** Ser. 3. **Strigillosa** Z. R. Wang)。本系有 3 种。

108.叶片狭披针形至线状披针形;下部有多对羽片缩短;羽片较短(3~4 cm),几无柄,其裂片在 10 对以下,边缘仅有小锯齿;叶轴上部的芽胞常较大。产贵州和云南 ………………… …………………………………… 107.**芽胞蹄盖蕨 A. clarkei** Bedd.

108.叶片披针形至狭披针形;基部仅 1~2 对羽片稍有缩短;羽片较长(6~11 cm),常有短柄,其裂片在 10 对以上,边缘有重锯齿或裂片;叶轴上部的芽胞较小。

109.小羽片三角状阔披针形;边缘的浅裂片上仅有细微锯齿。产湖南、江西、广东、广西、四川、贵州和云南 ……………………………… 108.**胎生蹄盖蕨 A. viviparum** Christ

109.小羽片卵状长圆形;边缘的浅裂片上有长约 1 mm 的尖锯齿。产湖南、江西、广东、广西、四川、贵州、云南、西藏和台湾 …………………………………… ……………… 109.**软刺蹄盖蕨 A. strigillosum** (Moore ex Lowe) Moore ex Salom

107.叶片阔卵形、卵形或披针形;分离羽片不超过 15 对;叶轴近顶部通常无芽胞,偶有(系 4. **长江蹄盖蕨系** Ser. 4. **Iseana** Z. R. Wang)。本系有 8 种。

110.小型植物,高不超过 30 cm;叶片披针形,宽不足 6 cm;羽片狭小,宽不及 1 cm;孢子囊群着生于小脉基部。产云南、西藏和台湾 ………… 110. **黑足蹄盖蕨 A. nigripes** (Bl.) Moore

110.中型植物,高通常在 30 cm 以上;叶片阔卵形或卵形,宽在 6 cm 以上;羽片宽在 1 cm 以上;孢子囊群着生于小脉中部或中下部。

111.小羽片浅裂至中裂,罕达深裂,钝圆头,边缘有钝锯齿;孢子囊群通直;叶干后纸质。

112.叶片长圆状卵形;下部数对羽片对生或近对生;叶柄及叶轴禾秆色。产云南和贵州 ………………………………… 111. **广南蹄盖蕨 A. guangnanense** Ching

112.叶片近三角形;除基部一对近对生外,羽片互生;叶柄及叶轴通常带淡紫红色。产广西、四川、云南和台湾 ………………… 112.**高山蹄盖蕨 A. silvicola** Tagawa

111.小羽片中裂至全裂,尖头或钝尖头,边缘有尖锯齿;孢子囊群有直有弯或通直;叶干后草质。

113.叶片阔卵形或卵形;小羽片、裂片彼此接近;小羽片长圆状卵形至长三角状卵形,中肋左右近对称;孢子囊群通直,很少弯弓;叶轴近顶部无芽胞。

114.叶柄和叶轴带淡紫红色,质脆易折;羽轴下面被密短毛。产四川和贵州 ……………………………………………………………………………………… 113.密羽蹄盖蕨 **A. imbricatum** Christ

114.叶柄和叶轴禾秆色,质较坚实;羽轴下面无毛。

115.叶柄通常比叶片长;叶片卵形,先端急缩;羽片不足10对。产云南 ………………………………………………… 114.西畴蹄盖蕨 **A. xichouense** Y. T. Hsieh et Z. R. Wang

115.叶柄通常比叶片短;叶片长圆形,先端渐尖;羽片13对左右。产湖南 …………………………………………………………………… 115.南岳蹄盖蕨 **A. nanyueense** Ching

113.叶片卵形至狭卵形,少有披针形;小羽片、裂片彼此离开;小羽片长圆状卵形,中肋左右显著不对称;孢子囊群有直有弯多种形状;叶轴近顶部往往有芽胞。

116.叶片中部羽片的小羽片上先出。产台湾、浙江、湖南、湖北、广西和贵州 ………………………………………………………… 116.合欢山蹄盖蕨 **A. cryptogrammoides** Hayata

116.叶片中部羽片的小羽片近对生。产江苏、浙江、安徽、福建、台湾、江西、湖南、湖北、广西、广东、四川、贵州、云南和西藏 ……………………………………… 117.长江蹄盖蕨 **A. iseanum** Ros.

Key to the species

1. Sori rotund or elliptic, exindusiate or indusia caducous; spore perispore with prominent folds on the surface.

2. Petioles and raches dark brown, bearing throughout dense castaneous black or dark brown, mixed scales of ovate-lanceolate and fibrous ones; basalpinnae gradually shortened towards base; pinna apex obtus; petioles far shorter than laminae(Sect. 1. **Wallichiana** (X. C. Zhang) Z. R. Wang). Only one species included. In Northwest Yunnan, West Sichuan and Southeast Xizang …… 1. **A. wallichianum** Ching

2. Petioles and raches stramineous or pale purplish red, bearing more brown scales only at the base; only 1～2 pairs of basal pinnae slightly shortened; petioles slightly shorter than laminae; pinna apex acuminate (Sect. 2. **Dissitifolia** (X. C. Zhang) Z. R. Wang). 2 species included.

3. Laminae pinnate; pinnae pinnatilobate to pinnatipartite, occasionally bipinnate, sessile or subsessile (stipes less than 3 mm long); teeth short and spread. In Hunan, Guangxi, Sichuan, Guizhou and Yunnan ……………………………………………………… 2. **A. dissitifolium** (Bak.) C. Chr.

3. Laminae bipinnate; pinnae prominently stipitate (stipes may up to more than 10 mm long); teeth long and obliquely upward. In Northwest Yunnan and Xizang ……………… 3. **A. exindusiatum** Ching

1. Sori elliptic, short-linear, J-shaped, hippocrepiform or reniform; indusia persistent, occasionally incomplete but visible, at least when young; spore perispore with or without prominent folds on the surface.

4. Rhizomes long- or short-creeping, fronds distant or approximate, spore perispore with or without folds; if rhizomes erect, spore perispore with prominent folds; pinnae sessile not auriculate at the acroscopic bases.

5. Rhizomes long-creeping; costae and costules bearing prominent spine-like processes adaxially; spore perispore with or without folds.

6. Middle-sized plant, more than 20 cm high; laminae tripinnate or more times divided, with narrow wings along costae and costules; sori not close to costae or costules, indusia not overlay costae or costules; spore perispore with prominent folds(Sect. 3. **Pectinata** (Ching et Y. T. Hsieh) Z. R. Wang). Only one species included. In Xizang …… 4. **A. pectinatum** (Wall. ex Mett.) Moore

6. Small plant, less than 20 cm high; laminae pinnate, pinnae pinnatipartite; sori close to costae or costules, indusia often overlay costae or costules; spore perispore without folds. In Northwest Yunnan (belonging to Section 14., Subsection 2., Series 2. Fangiana Z. R. Wang) ………………………………………………… 100. **A. chingianum** Z. R. Wang et X. C. Zhang

5. Rhizomes long- or short-creeping, or erect, but pinnae sessile not auriculate at the acroscopic bases; costae and costules without processes adaxially; spore perispore with prominent folds on the surface (Sect. 4. **Niponica** Ching et Y. T. Hsieh). 4 series included.

7. Rhizomes long-creeping; fronds distant (Ser. 1. **Biserrulata** Ching et Y. T. Hsieh). 3 species included.

8. Laminae monomorphic, petioles shorter than laminae or equal in lenth; laminae ovate-oblong; pinnae 15～20 pairs; basal pair of pinnae shortened, basiscopic lobes of costa nearly as long as acroscopic ones.

9. Laminae bipinnate, suprasurface glabrous; teeth not long-apiculate. In Yunnan, Sichuan and Xizang ………………………………………………………… 5. **A. biserrulatum** Christ

9. Laminae tripinnate, suprasurface pubescent; teeth long-apiculate. In Yunnan ……………………………………………………………………… 6. **A. wumonshanenicum** Ching

8. Laminae subdimorphic, petioles of sterile frond shorter than laminae, but the one of fertile frond far longer than laminae; laminae deltoid-ovate, pinnae 3～5 pairs; basal pair of pinnae not shortened, basiscopic lobes of costa longer than acroscopic ones. In Yunnan ……… 7. **A. ruilicola** W. M. Chu

7. Rhizomes short-creeping (occasionally long-creeping), fronds approximate; or rhizomes erect, but pinnae sessile, not auriculate at the acroscopic bases.

10. Laminae ovate to narrowly ovate, cuspidate at apex, only 1～2 pairs of basal pinnae slightly shortened; pinnae stipitate; petioles slightly shorter than laminae; scales at petioles base pale brown; sori short-linear, oblong or long J-shaped (Ser. 2. **Niponica** Ching et Y. H. Hsieh emend. Z. R. Wang). 2 species included.

11. Pinnae usually pinnate; pinnules ovate, oblong-lanceolate or falciform-lanceolate, shallowly lobed to pinnatipartite, basal pinnules usually shortly stipitate. In Liaoning, Nei Mongol, Beijing, Hebei, Shanxi, Henan, Shandong, Shaanxi, Gansu, Ningxia, Hubei, Hunan, Anhui, Jiangxi, Zhejiang, Jiangsu, Guangxi, Guangdong, Sichuan, Guizhou, Yunnan and Taiwan ……………………………………………………………………… 8. **A. niponicum** (Mett.) Hance

11. Pinnae usually pinnatipartite to pinnatisect; lobes falciform-lanceolate, at most shallowly lobed at margin, decurrent at the basiscopic bases and connected with the broad wing of costa. In Yunnan ……………………………………………………… 9. **A. brevisorum** (Wall. ex Hook.) Moore

10. Laminae lanceolate, oblong-lanceolate or oblanceolate, apex acuminate; pinnae sessile or occasionally shortly stipitate (stipe not more than 5 mm long); petioles far shorter than laminae; scales at petiole bases red-brown or castaneous; sori subrotund, elliptic, reniform or short J-shaped.

12. Indusia pallid, ciliated on margin; many pairs of basal pinnae gradually shortened towards the base or only 1～2 pairs of them prominently shortened; rhizomes short-creeping (Ser. 3. **Fallaciosa** Z. R. Wang). 3 species included.

13. Teeth at the lobe margin obtuse. In Heilongjiang, Jilin, Liaoning, Nei Mongol, Beijing, Hebei, Shanxi, Henan, Hubei, Shaanxi, Gansu and Ningxia …… 10. **A. fallaciosum** Milde

13. Teeth at the lobe margin sharp and long.

14. Raches and costae glabrous abaxially. In Sichuan, Yunnan and Xizang ……………………………………………………………… 11. **A. rupicola** (Edgew ex Hope) C. Chr.

14. Raches and costae pubescent abaxially. In Sichuan and Yunnan ……………………………………………………………………… 12. **A. glandulosum** Ching

12. Indusia pale brown, entire, basal pinnae not or almost not shortened; rhizomes erect, pinnae sessile not auriculate at the acroscopic bases (Ser. 4. **Yokoscentia** Z. R. Wang). 2 species included.

15. Scales at petiole bases yellow-brown, laminae pinnate-pinna pinnatipartite to bipinnate- pinnule pinnatilobate, pinnae narrow, lanceolate. In Heilongjiang, Jilin, Liaoning, Shandong, Anhui, Jiangsu, Zhejiang, Jiangxi, Hunan, Sichuan and Guizhou …… 13. A. **yokoscense** (Franch. et Sav.) Christ

15. Scales at petiole bases red-brown, but black-brown at the medial, laminae pinnate, pinnae pinnatilobate to pinnatipartite, broad, ovate ………………………………………………… 14. A. **fauriei** Christ

4. Rhizomes erect or ascendent, fronds caespitose.

16. Costae (or costules and midribs) without spine-like processes adaxially, at most on the costa top of bigger plants occasionally with extremely short processes, spore perispore with or without prominent folds.

17. Pinna bases prominently broadened, asymmetric, auriculate at acroscopic bases, usually cuneate at basiscopic bases; when laminae pinnate or more times divided, all lobes or pinnules anadromic; costae without spine-like processes on adaxial surface; spore perispore with prominent folds (occasionally without folds).

18. Middle-sized plants, fertile fronds more than 10 cm long, spore perispore with prominent folds (Sect. 5. **Polystichoides** Ching et Y. T. Hsieh emend. Z. R. Wang). 8 species included.

19. Laminae pinnate, pinnae margin repand or shallowly deltoid-lobed; acroscopic basal lobes of basal pinnae occasionally pinnatisect; raches glandular pubescent.

20. Pinna apex obtus, basal acroscopic auriculate lobes entire or slightly repand to dentate, raches with sparse black or brown glandular hairs. In Taiwan, Yunnan and Xizang …… ………………………………………………………… 15. A. **nakanoi** Makino

20. Pinna apex acute, bases acroscopic auriculate lobes denticulate at apex, raches with sparse brown glandular hairs. In West Guizhou …………………… 16. A. **zhenfengense** Ching

19. Laminae pinnate to bipinnate or more times divided, if pinnate, lobes of pinnae not deltoid; raches without glandular hairs (occasionally whth pale brown short unicellular hairs).

21. Laminae ovate to broadly ovate; basal pair of pinnae biggest and long ovate, with its basal 1~2 pairs of pinnules slightly shortened; ultimate pinnules or lobes obtus. In Yunnan and Xizang ……………………………………………… 17. A. **bucahwangense** Ching

21. Laminae narrowly lanceolate to ovate-lanceolate, basal pair of pinnae slightly shortened, deltoid-ovate to deltoid-lanceolate, with its basal pair of pinnules biggest; ultimate pinnules or lobes acute or rotund.

22. Raches without glandular hairs adaxially. In Taiwan ……………………………… ………………………………………………………… 18. A. **erythropodum** Hayata

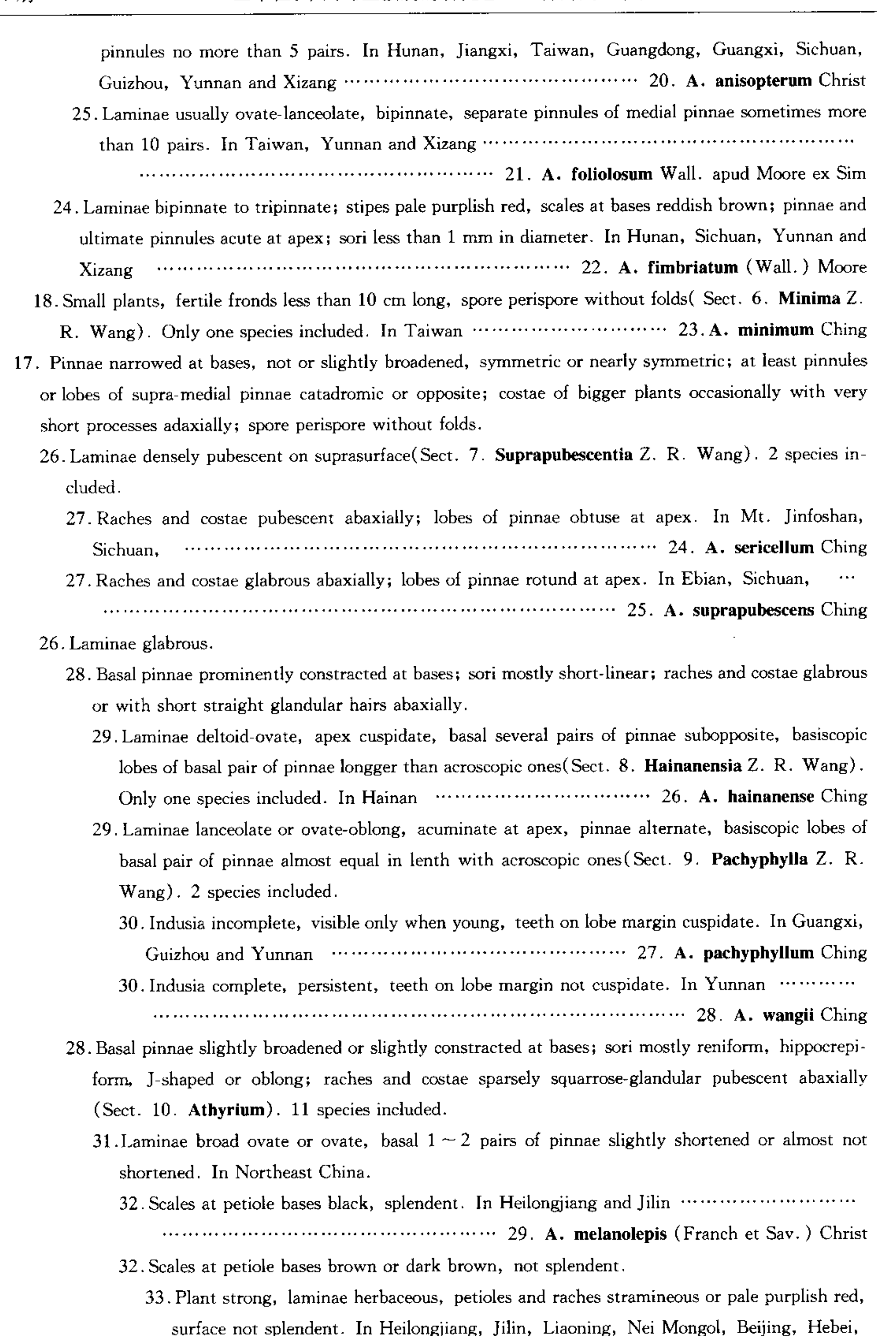
22. Raches glandular pubescent adaxially.

23. Laminae thickly papyraceus or thin-coriaceous, dark green, surface splendent; indusia small, partly fugacious when sori ripe. In Sichuan, Guizhou, Yunnan, Xizang and Taiwan ………………… 19. A. **drepanopterum** (Kunze) A. Br. ex Mett.

23. Laminae papyraceus or herbaceous, green, surface not splendent; indusia bigger, persistent.

24. Laminae pinnate to bipinnate; petioles stramineous, scales at bases brown or dark brown; pinnae and ultimate lobes rotund at apex; sori 1~2 mm in diameter.

25. Laminae usually lanceolate, pinnate, at most bipinnate at bases, but separate



pinnules no more than 5 pairs. In Hunan, Jiangxi, Taiwan, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan and Xizang ·· 20. **A. anisopterum** Christ

25. Laminae usually ovate-lanceolate, bipinnate, separate pinnules of medial pinnae sometimes more than 10 pairs. In Taiwan, Yunnan and Xizang ·· ··· 21. **A. foliolosum** Wall. apud Moore ex Sim

24. Laminae bipinnate to tripinnate; stipes pale purplish red, scales at bases reddish brown; pinnae and ultimate pinnules acute at apex; sori less than 1 mm in diameter. In Hunan, Sichuan, Yunnan and Xizang ·· 22. **A. fimbriatum** (Wall.) Moore

18. Small plants, fertile fronds less than 10 cm long, spore perispore without folds(Sect. 6. **Minima** Z. R. Wang). Only one species included. In Taiwan ·························· 23. **A. minimum** Ching

17. Pinnae narrowed at bases, not or slightly broadened, symmetric or nearly symmetric; at least pinnules or lobes of supra-medial pinnae catadromic or opposite; costae of bigger plants occasionally with very short processes adaxially; spore perispore without folds.

26. Laminae densely pubescent on suprasurface(Sect. 7. **Suprapubescentia** Z. R. Wang). 2 species included.

27. Raches and costae pubescent abaxially; lobes of pinnae obtuse at apex. In Mt. Jinfoshan, Sichuan, ·· 24. **A. sericellum** Ching

27. Raches and costae glabrous abaxially; lobes of pinnae rotund at apex. In Ebian, Sichuan, ··· ··· 25. **A. suprapubescens** Ching

26. Laminae glabrous.

28. Basal pinnae prominently constracted at bases; sori mostly short-linear; raches and costae glabrous or with short straight glandular hairs abaxially.

29. Laminae deltoid-ovate, apex cuspidate, basal several pairs of pinnae subopposite, basiscopic lobes of basal pair of pinnae longger than acroscopic ones(Sect. 8. **Hainanensia** Z. R. Wang). Only one species included. In Hainan ································ 26. **A. hainanense** Ching

29. Laminae lanceolate or ovate-oblong, acuminate at apex, pinnae alternate, basiscopic lobes of basal pair of pinnae almost equal in lenth with acroscopic ones(Sect. 9. **Pachyphylla** Z. R. Wang). 2 species included.

30. Indusia incomplete, visible only when young, teeth on lobe margin cuspidate. In Guangxi, Guizhou and Yunnan ··· 27. **A. pachyphyllum** Ching

30. Indusia complete, persistent, teeth on lobe margin not cuspidate. In Yunnan ··········· ··· 28. **A. wangii** Ching

28. Basal pinnae slightly broadened or slightly constracted at bases; sori mostly reniform, hippocrepiform, J-shaped or oblong; raches and costae sparsely squarrose-glandular pubescent abaxially (Sect. 10. **Athyrium**). 11 species included.

31. Laminae broad ovate or ovate, basal 1～2 pairs of pinnae slightly shortened or almost not shortened. In Northeast China.

32. Scales at petiole bases black, splendent. In Heilongjiang and Jilin ························ ··· 29. **A. melanolepis** (Franch et Sav.) Christ

32. Scales at petiole bases brown or dark brown, not splendent.

33. Plant strong, laminae herbaceous, petioles and raches stramineous or pale purplish red, surface not splendent. In Heilongjiang, Jilin, Liaoning, Nei Mongol, Beijing, Hebei,

Shanxi and North Shandong ………………………………… 30. A. **brevifrons** Nakai ex Kitagawa

33. Plant thin and smaller, laminae thin herbaceous, petioles and raches pale reddish, surface splendent. In Northeast Heilongjiang ……………………………………… 31. A. **rubripes** (Kom.) Kom.

31. Laminae narrowly ovate, elliptic-lanceolate or oblanceolate, more than 2～3 pairs of basal pinnae gradually shortened. From North to Southwest of China.

34. Laminae narrowly ovate, 2～3 pairs of basal pinnae shortened, but the basal pair of pinnae not shortened to auriculate. In Hebei, Shanxi, Nei Mongol, Shandong, Henan, Shaanxi, Gansu and Ningxia ……………………… 32. A. **sinense** Rupr. (Appearance similar to *A. filix-femina* (L.) Roth)

34. Laminae elliptic-lanceolate or oblanceolate, more than 4 pairs of basal pinnae gradually shortened, the basal pair often shortened to auriculate. From South Qingling to Xizang.

35. Scales at petiole bases lanceolate or linear-lanceolate, less than 1.5 mm wide, laminae pinnate-pinnae pinnatipartite, lobe margin serrate, lateral veinlets usually simple. In Sichuan and Yunnan ……………………………………………………………… 33. A. **attenuatum** (Clarke) Tagawa

35. Scales at petiole bases ovate or deltoid-ovate, more than 3～5 mm wide, laminae usually bipinnate, pinnules margin shallowly lobed or biserrate, lateral veinlets usually 2～4 furcate.

36. Laminae black when dry; scales at petiole bases castaneous at medial, brown at margin; pinnule apex rounded-truncate. In Norhtwest Yunnan …………… 34. A. **tarulakaense** Ching

36. Laminae not black when dry; scales at petiole bases brown or dark brown; pinnule apex obtuse.

37. Pinnae deltoid-ovate or deltoid-lanceolate, less than 3～4 cm long, approximat to each other. In Sichuan and Xizang ……………………… 35. A. **contigens** Ching et S. K. Wu

37. Pinnae linear-lanceolate, more than 4 cm long, separae by space from each other.

38. Lateral pinnae shortly stipitate, slightly constracted towards bases, pinnules up to 2.5～3 cm long. In Yunnan …………………………………… 36. A. **nudifrons** Ching

38. Lateral pinnae not stipitate, not constracted towards bases, pinnules usually less than 2.5～3 cm long.

39. Middle pinnae about 1 cm wide, with interval wider than pinna. In Gansu, Hubei, Sichuan and Yunnan ……………………… 37. A. **nephrodioides** (Bak.) Christ

39. Middle pinnae more than 1 cm wide, with interval far narrower than pinna.

40. Pinnae shorter, narrower, 3～6 cm long, less than 1.8 cm wide, prominently ascendent. In Sichuan ……………………………… 38. A. **adscendens** Ching

40. Pinnae longger, wider, patent or slightly ascendent. In Gansu, Sichuan, Guizhou, Yunnan and Xizang …………………………………………………… ……………………… 39. A. **dentigerum** (Wall. ex Clarke) Mehra et Bir

16. Costae (sometimes together with costules and midribs) with long or short spine-like processes on adaxial surface; spore perispore without folds on the surface.

41. Laminae pinnate, oblanceolate, pinnae pinnatilobate to pinnatipartite, many pairs of basal pinnae gradually shortened, the basal pair often shortened to auriculate (Sect. 11. **Stenopoda** Z. R. Wang). Only one species included. In Yunnan and Xizang ………………………………………… 40. A. **mehrae** Bir

41. Laminae pinnate to tripinnate, not oblanceolate, basal pinnae not shortened, or at most one to several

pairs slightly shortened, but the basal pair never shortened to auriculate.

42. Laminae narrowly lanceolate, pinnae more than 20～25 pairs(Sect. 12. **Multipinna** Z. R. Wang). 2 species included.

43. Laminae often less than 35 cm long, pinnate to bipinnate, lobe margin dentate, costae with short spine-like processes adaxially. In Zhejiang, Hunan, Jiangxi and Guizhou ………………………………………………………………………… 41. **A. multipinnum** Y. T. Hsieh et Z. R. Wang

43. Laminae up to more than 35 cm long, bipinnate, lobe margin long-serrulate, costae with long spine-like processes adaxially. In Jiangxi and Guangxi ………………………………… 42. **A. elongatum** Ching

42. Laminae broader, pinnae less than 20～25 pairs.

44. Indusia J-shaped, hippocrepiform, reniform, elliptic, short-linear etc., lateral, across or dorsal on veinlets; scales at petiole bases often yellow-brown, brown or dark brown(Sect. 13. **Mackinnoniana** (Ching et Y. T. Hsieh) Z. R. Wang). 4 series included.

45. Pinnules or lobes of supra-medial pinnae anadromic, occasionally catadromic or subopposite, raches and costae stramineous, occasionally pale purplish red, glabrous or sparsely pubescent abaxially; the narrow wing margins of costae or the sinus between lobes glabrous(Ser. 1. **Devoliana** Z. R. Wang). 9 species included.

46. Pinnules or lobes of supra-medial pinnae anadromic, alternate, or only basal pair subopposite.

47. Pinnae (especially the top ones)or pinnules reflexed.

48. Laminae pinnate, pinnae at most pinnatipartite, sessile, reflexed, except the top one patent. In Taiwan ……………………………………… 43. **A. reflexipinnum** Hayata

48. Laminae pinnate to bipinnate, pinnae shortly stipitate, usually patent or ascendent, only the top ones reflexed; pinnules occasionally pinnatisect, reflexed or patent.

49. Sori hippocrepiform, pinnules lanceolate, subsessile. In Zhejiang, Fujian, Jiangxi, Guangxi, Sichuan, Guizhou, Yunnan and Xizang …………… 44. **A. devolii** Ching

49. Sori oblong or J-shaped; pinnules ovato-deltoid or oblong, prominently stipitate or the bases decursive and connected with the narrow wing of costa.

50. Pinnules ovato-deltoid, acute at apex, prominently stipitate (stipes about 1 mm long). In Zhejiang, Qingyuan …… 45. **A. baishanzuense** Ching et Y. T. Hsieh

50. Pinnules oblong, rotund-obtuse at apex, the bases decursive and connected with the narrow wing of costa. In Mt. Maoshan, Zhejiang …………………………………………………………………… 46. **A. maoshanense** Ching et P. S. Chiu

47. Pinnae (especially the top ones) or pinnules ascendent or at most nearly patent.

51. Basal pinnae alternate, at most the basal pair subopposite; raches and costae pale purplish red, prominently with spine-like processes adaxially, but costules without processes. In Taiwan ……………………………………………………… 47. **A. tripinnatum** Tagawa

51. One to several pairs of basal pinnae opposite or subopposite; raches and costae stramineous, with very short spine-like processes adaxially, costules also with processes.

52. The basal pair of pinnules subopposite, raches and costae sparsely pubescent abaxially. In Fujian, Jiangxi, Hunan, Sichuan and Guizhou …… 48. **A. deltoidofrons** Makino

52. The basal pinnules anadromic, raches and costae glabrous abaxiolly. In Guangxi, Sichuan, Guizhou, Yunnan and Xizang … 49. **A. delicatulum** Ching et S. K. Wu

46. Pinnules or lobes of supra-medial pinnae opposite or subopposite.

53. Pinnules or lobes reflexed or nearly patent. In Taiwan ………… 50. **A. oppositipinnum** Hayata

53. Pinnules or lobes patent. In Sichuan ……………………………………… 51. **A. crassipes** Ching

45. Pinnules or lobes of supra-medial pinnae catadromic or subopposite; raches and costae usually pale purplish red, rarely stramineous, pubescens abaxially; the narrow wing margins of costa or the sinus between lobes sparsely pubescent or glabrous.

54. Indusia usually reniform, rotund-reniform or elliptic; laminae broad ovate, the basal pair of pinnae biggest, acuminate at apex; scales yellow-brown(Ser. 2. **Omeiensia** Z. R. Wang). 1 species included. In Hubei, Hunan, Shaanxi, Gansu, Sichuan and Yunnan ………………… 52. **A. omeiense** Ching

54. Indusia usually oblong, J-shaped or hippocrepiform; laminae usually oblong-ovate, cuspidate or acuminate at apex, the basal pair of pinnae almost as large as or slightly bigger than the second pair ; scales brown or dark brown.

55. Pinnae prominently stipitate(stipes usually more than 2 mm long), alternate, except the basal pair subopposite; the narrow wing margins of costa or the sinus between lobes glabrous, rarely sparsely pubescent; indusia margin subentire or erose(Ser. 3. **Mackinnoniana** Z. R. Wang). 7 species included.

56. The narrow wing margins of costae glabrous, raches and costae glabrous or sparsely pubescent.

57. Pinnules oblong, rotund-obtus at apex. In Zhejiang and Anhui …………………………… ……………………………………………… 53. **A. intermixtum** Ching et P. S. Chiu

57. Pinnules ovate to oblong-lanceolate acute at apex.

58. Lamina apex usually acuminate; raches and costae glabrous abaxially, pinnules of middle and lower pinnae pinnatipartite to pinnatisect.

59. Scales pale brown, linear-lanceolate, costae pale purplish red abaxially. In Sichuan ……………………………………………………… 54. **A. costulelisorum** Ching

59. Scales dark brown, ovate to ovate-lanceolate, costae stramineous. In Xizang ……… ……………………………………………… 55. **A. dentilobum** Ching et S. K. Wu

58. Lamina apex often cuspidate; raches and costae sparsely pubescent abaxially, pinnules of middle and lower pinnae pinnatilobate to pinnatipartite.

60. Costae pale purplish red; laminae thin herbaceous, prominently cuspidate at apex. In Henan, Anhui, Jiangxi, Zhejiang, Fujian, Taiwan, Hubei, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Shaanxi and Gansu ………………………………… ……………………………………… 56. **A. vidalii** (Franch. et Sav.) Nakai

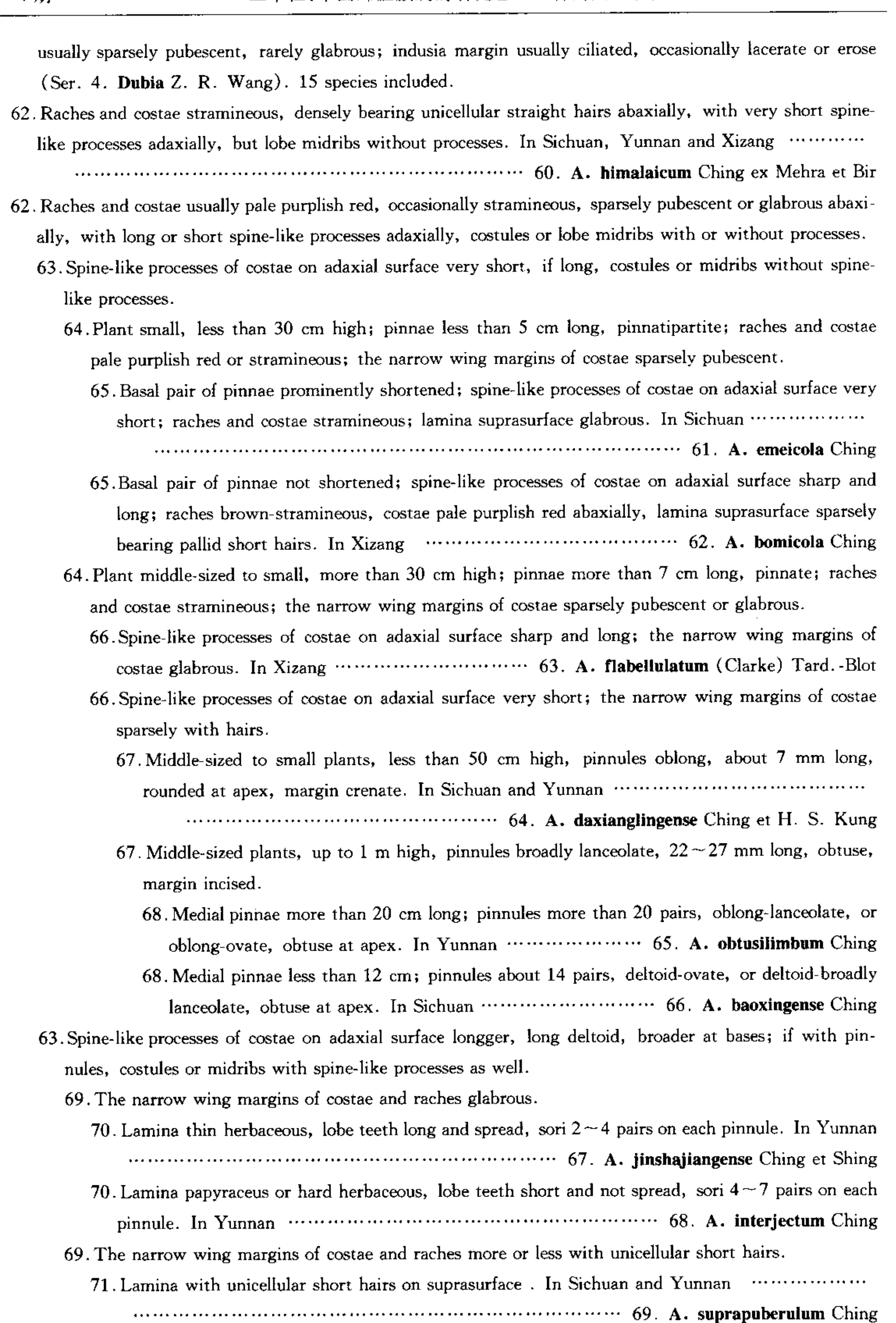
60. Costae stramineous; laminae papyraceus, often not prominently cuspidate at apex. In Hubei, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu and Xizang ……………………………………… 57. **A. mackinnonii** (Hope) C. Chr.

56. The narrow wing margins of costae sparsely pubescent, costae densely pubescent abaxially.

61. Lamina suprasurface and lobe margin sparsely pubescent, pinnules long deltoid to deltoid-oblong, acute at apex. In Sichuan ………… 58. **A. ludingense** Z. R. Wang et L. B. Zhang

61. Lamina suprasurface and lobe margin glabrous, pinnules oblong to deltoid-ovate, obtuse at apex. In Gansu and Sichuan ……………………………… 59. **A. hirtirachis** Ching et Hsu

55. Pinnae usually sessile, occasionally shortly stipitate(stipes no more than 2 mm), basal 3 or more pairs often opposite or subopposite; the narrow wing margins of costa or the sinus between lobes



usually sparsely pubescent, rarely glabrous; indusia margin usually ciliated, occasionally lacerate or erose (Ser. 4. **Dubia** Z. R. Wang). 15 species included.

62. Raches and costae stramineous, densely bearing unicellular straight hairs abaxially, with very short spine-like processes adaxially, but lobe midribs without processes. In Sichuan, Yunnan and Xizang ………… ……………………………………………………………… 60. **A. himalaicum** Ching ex Mehra et Bir

62. Raches and costae usually pale purplish red, occasionally stramineous, sparsely pubescent or glabrous abaxially, with long or short spine-like processes adaxially, costules or lobe midribs with or without processes.

63. Spine-like processes of costae on adaxial surface very short, if long, costules or midribs without spine-like processes.

64. Plant small, less than 30 cm high; pinnae less than 5 cm long, pinnatipartite; raches and costae pale purplish red or stramineous; the narrow wing margins of costae sparsely pubescent.

65. Basal pair of pinnae prominently shortened; spine-like processes of costae on adaxial surface very short; raches and costae stramineous; lamina suprasurface glabrous. In Sichuan ……………… ……………………………………………………………………… 61. **A. emeicola** Ching

65. Basal pair of pinnae not shortened; spine-like processes of costae on adaxial surface sharp and long; raches brown-stramineous, costae pale purplish red abaxially, lamina suprasurface sparsely bearing pallid short hairs. In Xizang ………………………………… 62. **A. bomicola** Ching

64. Plant middle-sized to small, more than 30 cm high; pinnae more than 7 cm long, pinnate; raches and costae stramineous; the narrow wing margins of costae sparsely pubescent or glabrous.

66. Spine-like processes of costae on adaxial surface sharp and long; the narrow wing margins of costae glabrous. In Xizang ………………………… 63. **A. flabellulatum** (Clarke) Tard.-Blot

66. Spine-like processes of costae on adaxial surface very short; the narrow wing margins of costae sparsely with hairs.

67. Middle-sized to small plants, less than 50 cm high, pinnules oblong, about 7 mm long, rounded at apex, margin crenate. In Sichuan and Yunnan ………………………………… ……………………………………… 64. **A. daxianglingense** Ching et H. S. Kung

67. Middle-sized plants, up to 1 m high, pinnules broadly lanceolate, 22～27 mm long, obtuse, margin incised.

68. Medial pinnae more than 20 cm long; pinnules more than 20 pairs, oblong-lanceolate, or oblong-ovate, obtuse at apex. In Yunnan ………………… 65. **A. obtusilimbum** Ching

68. Medial pinnae less than 12 cm; pinnules about 14 pairs, deltoid-ovate, or deltoid-broadly lanceolate, obtuse at apex. In Sichuan …………………… 66. **A. baoxingense** Ching

63. Spine-like processes of costae on adaxial surface longger, long deltoid, broader at bases; if with pinnules, costules or midribs with spine-like processes as well.

69. The narrow wing margins of costae and raches glabrous.

70. Lamina thin herbaceous, lobe teeth long and spread, sori 2～4 pairs on each pinnule. In Yunnan ……………………………………………………… 67. **A. jinshajiangense** Ching et Shing

70. Lamina papyraceus or hard herbaceous, lobe teeth short and not spread, sori 4～7 pairs on each pinnule. In Yunnan ……………………………………………… 68. **A. interjectum** Ching

69. The narrow wing margins of costae and raches more or less with unicellular short hairs.

71. Lamina with unicellular short hairs on suprasurface . In Sichuan and Yunnan ……………… …………………………………………………………… 69. **A. suprapuberulum** Ching

71. Lamina suprasurface glabrous.

72. Pinnae and lobes small, pinnae less than 1 cm wide, lobes oblong, 2～3 mm wide, rounded-truncate at apex ; scales at petiole bases black in centre, prominently with narrow pale brown margin. In Xizang ·· 70. **A. zayuense** Z. R. Wang

72. Pinnae and lobes bigger, pinnae usually more than 2 cm wide, obtuse at apex; scales at petiole bases dark brown in centre, gradually pale towards margin.

73. Basal pinnules of pinnae often reflexed. In Yunnan ························ 71. **A. lineare** Ching

73. Pinnnles patent or ascendent.

74. Laminae bipinnate-pinnules pinnatisect to tripinnate-secondary pinnules pinnatilobate; basal pair of pinnae far bigger than the upper, oblong-ovate; costae and costules with short spine-like processeson adaxially. In Yunnan ···························· 72. **A. chungtienense** Ching

74. Laminae pinnate-pinnae pinnatisect to bipinnate-pinnules pinnatilobate; basal pair of pinnae similar to or slightly shorter than the upper ones, narrowly lanceolate or narrowly oblanceolate; only the big pinnae with spine-like processes on their costules adaxially.

75. The bases of medial pinnae asymmetric; teeth at pinnule or lobe margin sharp and long. In Sichuan, Yunnan and Xizang ································ 73. **A. austro-orientale** Ching

75. The bases of medial pinnae nearly symmetric; teeth at pinnule or lobe margin short. In Sichuan, Guizhou, Yunnan and Xizang ···························· 74. **A. dubium** Ching

44. Indusia usually short-linear or oblong, straight, lateral on veinlets, often close to midrib, at most those at lamina apex or acroscopic base of pinnule occasionally curved; scales at petiole bases often black or dark-brown(Sect. 14. **Otophora** Z. R. Wang). 2 subsections included.

76. Costae with subulate, short spine-like processes adaxially, costules or midribs without processes, occasionally with, but very short(Subsect. 1. **Otophora** Z. R. Wang). 3 series included.

77. Lamina broadly ovate or ovate, often cuspidate at apex, rarely long ovate, short acuminate at apex; pinnae usually prominently stipitate (stipes usually more than 2～3 mm long)(Ser. 1. **Wardiana** Z. R. Wang). 8 species included.

78. Pinnules of the basal 2～3 pairs of pinnae anadromic, pinnules prominently stipitate (stipes 3～5 mm long); raches and costae glabrous abaxially. In Anhui, Zhejiang, Taiwan, Hubei, Hunan, Fujian, Jiangxi, Guangxi, Sichuan and Guizhou ······················ 75. **A. clivicola** Tagawa

78. Only the pinnules of basal pair of pinnae anadromic, pinnules of the rest pinnae subopposite or catadromic, shortly stipitate; raches and costae pubescent abaxially, rarely glabrate.

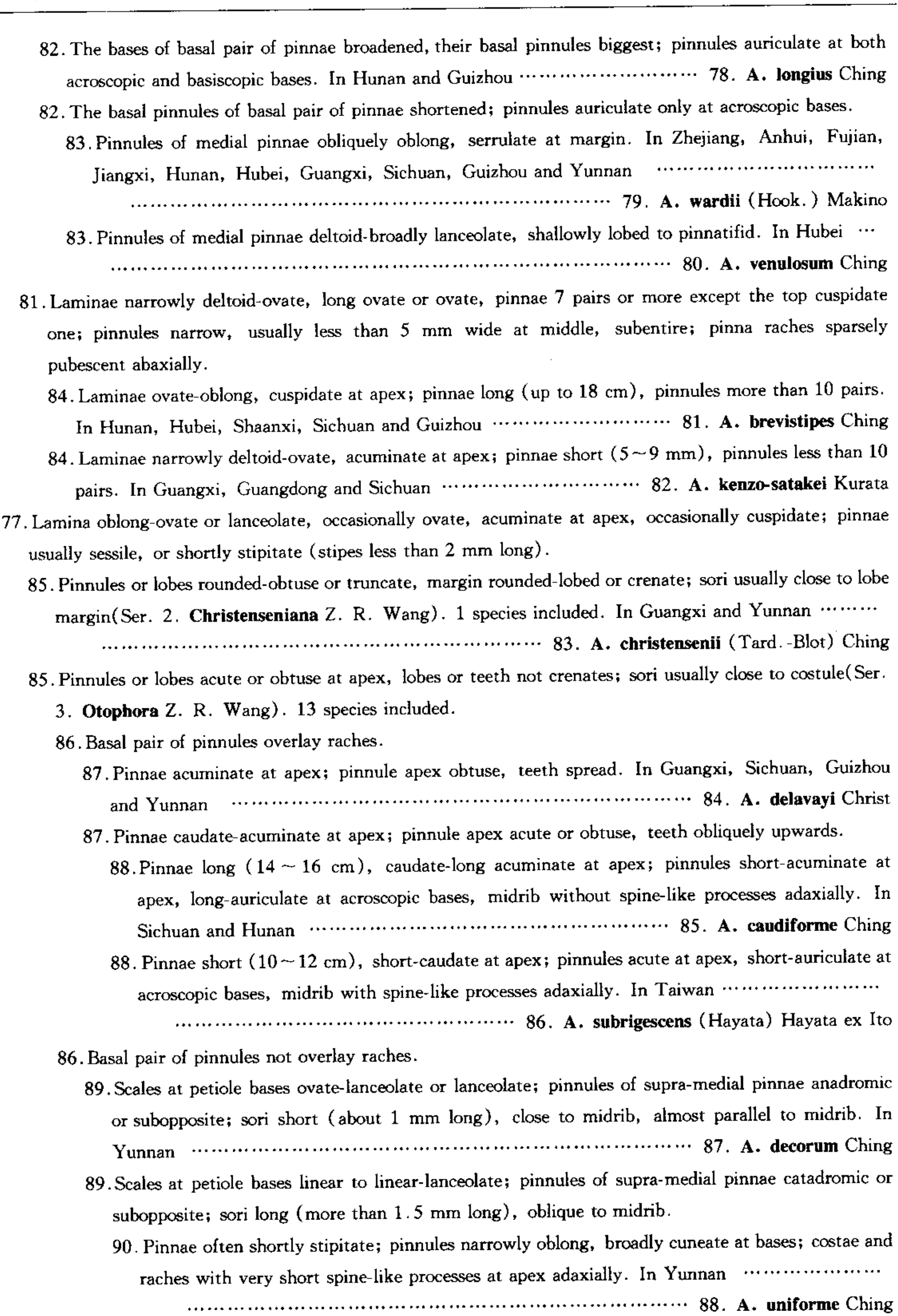
79. Pinnules lobed, lobes sometimes 1 mm long, or duplicto-dentate. In Guangxi ·· 76. **A. infrapuberulum** Ching

79. Pinnules subentire or serrate or lobed.

80. Pinnules lanceolate to narrowly lanceolate, length 3 or more times as long as width; sori subparallel to midrib; indusia erose. In Shaanxi, Sichuan and Yunnan ·· 77. **A. criticum** Ching et Y. T. Hsieh

80. Pinnules deltoid, oblong-ovate or ovate, rarely long ovate, lengthless than 3 times as long as width; sori not parallel to midrib; indusia entire or subentire.

81. Laminae deltoid or deltoid-ovate, pinnae about 5 pairs except the top cuspidate one; pinnules broad, usually more than 5 mm in width at the middle, serrate at margin; costae densely pubescent abaxially.



82. The bases of basal pair of pinnae broadened, their basal pinnules biggest; pinnules auriculate at both acroscopic and basiscopic bases. In Hunan and Guizhou ······ 78. **A. longius** Ching

82. The basal pinnules of basal pair of pinnae shortened; pinnules auriculate only at acroscopic bases.

83. Pinnules of medial pinnae obliquely oblong, serrulate at margin. In Zhejiang, Anhui, Fujian, Jiangxi, Hunan, Hubei, Guangxi, Sichuan, Guizhou and Yunnan ······ 79. **A. wardii** (Hook.) Makino

83. Pinnules of medial pinnae deltoid-broadly lanceolate, shallowly lobed to pinnatifid. In Hubei ······ 80. **A. venulosum** Ching

81. Laminae narrowly deltoid-ovate, long ovate or ovate, pinnae 7 pairs or more except the top cuspidate one; pinnules narrow, usually less than 5 mm wide at middle, subentire; pinna raches sparsely pubescent abaxially.

84. Laminae ovate-oblong, cuspidate at apex; pinnae long (up to 18 cm), pinnules more than 10 pairs. In Hunan, Hubei, Shaanxi, Sichuan and Guizhou ······ 81. **A. brevistipes** Ching

84. Laminae narrowly deltoid-ovate, acuminate at apex; pinnae short (5～9 mm), pinnules less than 10 pairs. In Guangxi, Guangdong and Sichuan ······ 82. **A. kenzo-satakei** Kurata

77. Lamina oblong-ovate or lanceolate, occasionally ovate, acuminate at apex, occasionally cuspidate; pinnae usually sessile, or shortly stipitate (stipes less than 2 mm long).

85. Pinnules or lobes rounded-obtuse or truncate, margin rounded-lobed or crenate; sori usually close to lobe margin(Ser. 2. **Christenseniana** Z. R. Wang). 1 species included. In Guangxi and Yunnan ······ 83. **A. christensenii** (Tard.-Blot) Ching

85. Pinnules or lobes acute or obtuse at apex, lobes or teeth not crenates; sori usually close to costule(Ser. 3. **Otophora** Z. R. Wang). 13 species included.

86. Basal pair of pinnules overlay raches.

87. Pinnae acuminate at apex; pinnule apex obtuse, teeth spread. In Guangxi, Sichuan, Guizhou and Yunnan ······ 84. **A. delavayi** Christ

87. Pinnae caudate-acuminate at apex; pinnule apex acute or obtuse, teeth obliquely upwards.

88. Pinnae long (14～16 cm), caudate-long acuminate at apex; pinnules short-acuminate at apex, long-auriculate at acroscopic bases, midrib without spine-like processes adaxially. In Sichuan and Hunan ······ 85. **A. caudiforme** Ching

88. Pinnae short (10～12 cm), short-caudate at apex; pinnules acute at apex, short-auriculate at acroscopic bases, midrib with spine-like processes adaxially. In Taiwan ······ 86. **A. subrigescens** (Hayata) Hayata ex Ito

86. Basal pair of pinnules not overlay raches.

89. Scales at petiole bases ovate-lanceolate or lanceolate; pinnules of supra-medial pinnae anadromic or subopposite; sori short (about 1 mm long), close to midrib, almost parallel to midrib. In Yunnan ······ 87. **A. decorum** Ching

89. Scales at petiole bases linear to linear-lanceolate; pinnules of supra-medial pinnae catadromic or subopposite; sori long (more than 1.5 mm long), oblique to midrib.

90. Pinnae often shortly stipitate; pinnules narrowly oblong, broadly cuneate at bases; costae and raches with very short spine-like processes at apex adaxially. In Yunnan ······ 88. **A. uniforme** Ching

90. Pinnae sessile or very shortly stipitate; pinnules not narrowly oblong, cuneate at basiscopic

bases, truncate and parallel to costae at acroscopic bases; spine-like processes at the apex of costae and raches at apex on adaxial surface prominent.

91. Laminae narrowly ovate or lanceolate, acuminate at apex.

92. Costules prominently with spine-like processes adaxially; raches and costae densely pubescent or glabrous abaxially.

93. Raches and costae glabrous abaxially; pinnules and lobes usually obtuse at apex, almost not lobed at margin, teeth thin. In Yunna ·· 89. A. **roseum** Christ

93. Raches and costae densely pubescent abaxially; pinnules and lobes usually rounded-obtuse at apex, shallowly lobed or prominently serrate at margin. In Yunnan, Sichuan and Taiwan ··········· ·· 90. A. **mengtzeense** Hieron

92. Costules without or with very short spine-like processes adaxially; raches and costae densely pubescent abaxially.

94. Petioles, raches and costae pale purplish red; pinnae shortly stipitate (stipes 1～3 mm long) or subsessile. In Hubei, Hunan, Fujian, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan and Taiwan ·· 91. A. **epirachis** (Christ) Ching

94. Petioles, raches and costae stramineous; pinnae sessile. In Hubei, Hunan, Guangxi, Sichuan, Guizhou and Yunnan ···································· 92. A. **pubicostatum** Ching et Z. Y. Liu

91. Laminae ovate or deltoid-ovate, occasionally long ovate, slightly cuspidate or short acuminate at apex.

95. Raches and costae glabrous abaxially; pinnae sessile.

96. Basal pair of pinnae narrowly lanceolate, acroscopic pinnules of costae almost equal in lenth with the basiscopic ones. In Hubei, Hunan, Anhui, Zhejiang, Fujian, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan and Taiwan ······················ 93. A. **otophorum** (Miq.) Koidz.

96. Basal pair of pinnae ovate-lanceolate, basiscopic pinnules of costae longer than the acroscopic ones. In Yunnan and Taiwan ·· 94. A. **kuratae** Serizawa

95. Raches and costae pubescent abaxially; pinnae shortly stipitate.

97. Spine-like processes of raches and costae short, sparsely sparsely glandular pubescent abaxially; pinnules separate, short obtuse at apex. In Taiwan ······ 95. A. **arisanense** (Hayata) Tagawa

97. Spine-like processes of raches and costae long, densely with pale brown short glandular hairs abaxially; pinnules densely closed, acute at apex. In Yunnan ········ 96. A. **caudatum** Ching

76. Costae and costules with long needle-like processes adaxially, ultimate lobes midrib often with processes as well (Subsect. 2. **Strigillosa** (Ching et Y. T. Hsieh) Z. R. Wang). 4 series included.

98. Laminae tripinnate or more divided; secondary pinnules prominently stipitate; raches and costae glabrous abaxially (Ser. 1. **Rhachidosora** Z. R. Wang). 3 species included.

99. Laminae deltoid or ovate-deltoid; ultimate lobes broad, suboblong, usually more than 2～3 mm wide. In Yunnan ··· 97. A. **adpressum** Ching et W. M. Chu

99. Laminae elliptic; ultimate lobes slender and long, linear or long subulate, usually about 1 mm wide.

100. Ultimate lobes linear, ascendent; sori closely along both sides of costules, straight. In Sichuan, Yunnan and Xizang ·················· 98. A. **rhachidosorum** (Hand.-Mazz.) Ching

100. Ultimate lobes long-subulate, patent; sori borne on ultimate lobes, often curved. In Sichuan and Yunnan ·· 99. A. **araiostegioides** Ching

98. Laminae pinnate to bipinnate; pinnules at most pinnatifid; raches and costae pubescent or glabrous abaxially.

101. Sori oblong or short-linear, straight, close to midribs of pinnules or lobes, often partly overlap them when ripe; raches and costae glabrous abaxially, at most slightly pubescent at bases of costae(Ser. 2. **Fangiana** Z. R. Wang). 7 species included.

102. Small plants (fronds less 25 cm long), laminae narrowly deltoid or deltoid-ovate(three species under this item, as to the species *A. chingianum* Z. R. Wang et X. C. Zhang with long-reeping rhizomes, lamina glabrous on suprasurface, see item 6); laminae suprasurface glandular-pubescent.

103. Laminae deltoid, basal pinnae not shortened; lobes subentire; sori close to costules and in two lines along both sides of raches. In Yunnan ·············· 101. **A. supraspinenscens** C. Chr.

103. Laminae ovato-deltoid, basal pinnae slightly shortened; lobe margin crenate or serrato-lobed; sori distant from costules. In Xizang ······················ 102. **A. medogense** X. C. Zhang

102. Middle-sized plants (fronds more than 30 cm long), laminae broadly ovate to linear-lanceolate; lamina suprasurface glabrous.

104. Laminae pinnate; pinnae deltoid-lanceolate, less than 3.5 cm long, at most pinnatisect, lobes densely neighboring. In Yunnan ·· 103. **A. yui** Ching

104. Laminae bipinnate; pinnae lanceolate or linear-lanceolate, 5～20 cm long, pinnules separate from each other.

105. Laminae ovate to oblong-lanceolate; ultimate lobe subentire or only slightly serrulate. In Sichuan and Yunnan ··· 104. **A. fangii** Ching

105. Laminae broadly ovate to ovate; ultimate lobe margin prominently with long or short teeth.

106. Pinnae 13～16 pairs; pinnules oblong; raches and costae glabrous abaxially. In Yunnan and Xizang ·················· 105. **A. nyelamense** Y. T. Hsieh et Z. R. Wang

106. Pinnae 6～7 pairs; pinnules obovate or oblong; raches and costae densely pubescent abaxially. In Yunnan ········ 106. **A. yuanyangense** Y. T. Hsieh et W. M. Chu

101. Sori curved or straight, not close to midribs of pinnules or lobes, not overlap them when ripe; raches and costae pubescent abaxially, rarely glabrous.

107. Laminae lanceolate to linear-lanceolate; pinnae usually more than 18 pairs; raches usually bearing bulblets below the apex(Ser. 3. **Strigillosa** Z. R. Wang). 3 species included.

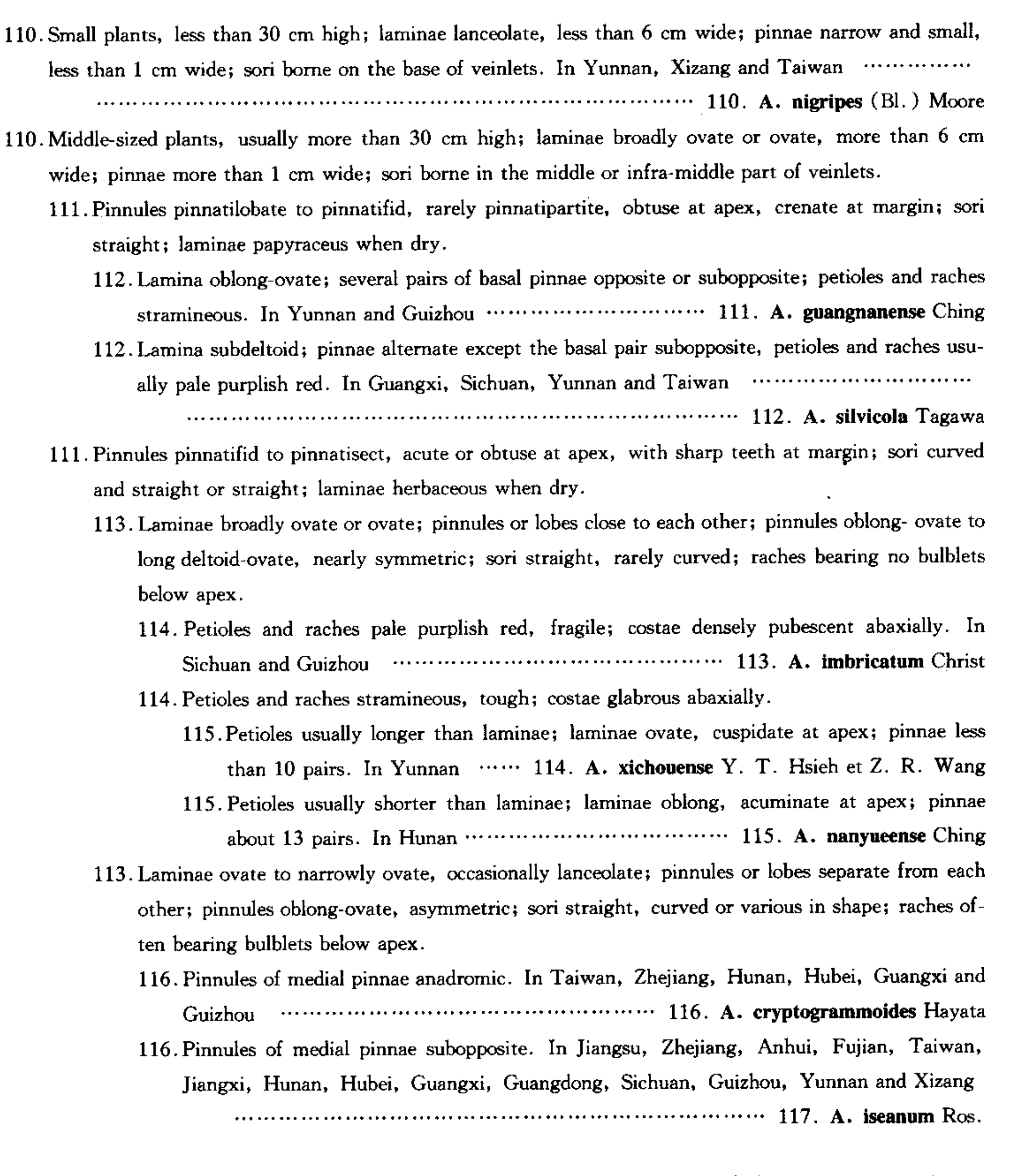
108. Laminae narrowly lanceolate to linear-lanceolate; many pairs of basal pinnae shortened; pinnae short (3～4 cm long), subsessile, lobes less than 10 pairs, only with small teeth; bulblets of raches usually bigger. In Guizhou and Yunnan ························· 107. **A. clarkei** Bedd.

108. Laminae lanceolate to narrowly lanceolate; only 1～2 pairs of basal pinnae slightly shortened; pinnae long (6～11 cm long), usually shortly stipitate, lobes more than 10 pairs, biserrate or lobed at margin; bulblets of raches small.

109. Pinnules deltoid-broadly lanceolate; lobes only with minute teeth . In Hunan, Jiangxi, Guangdong, Guangxi, Sichuan, Guizhou and Yunnan ······ 108. **A. viviparum** Christ

109. Pinnules ovate-oblong; lobes with about 1 mm long sharp teeth. In Hunan, Jiangxi, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan ················ ······························· 109. **A. strigillosum** (Moore ex Lowe) Moore ex Salom

107. Laminae broadly ovate, ovate or lanceolate; pinnae less than 15 pairs; raches unusually bearing bulblets below apex(Ser. 4. **Iseana** Z. R. Wang). 8 species included.



110. Small plants, less than 30 cm high; laminae lanceolate, less than 6 cm wide; pinnae narrow and small, less than 1 cm wide; sori borne on the base of veinlets. In Yunnan, Xizang and Taiwan ··· 110. A. **nigripes** (Bl.) Moore

110. Middle-sized plants, usually more than 30 cm high; laminae broadly ovate or ovate, more than 6 cm wide; pinnae more than 1 cm wide; sori borne in the middle or infra-middle part of veinlets.

111. Pinnules pinnatilobate to pinnatifid, rarely pinnatipartite, obtuse at apex, crenate at margin; sori straight; laminae papyraceus when dry.

112. Lamina oblong-ovate; several pairs of basal pinnae opposite or subopposite; petioles and raches stramineous. In Yunnan and Guizhou ························ 111. A. **guangnanense** Ching

112. Lamina subdeltoid; pinnae alternate except the basal pair subopposite, petioles and raches usually pale purplish red. In Guangxi, Sichuan, Yunnan and Taiwan ·· 112. A. **silvicola** Tagawa

111. Pinnules pinnatifid to pinnatisect, acute or obtuse at apex, with sharp teeth at margin; sori curved and straight or straight; laminae herbaceous when dry.

113. Laminae broadly ovate or ovate; pinnules or lobes close to each other; pinnules oblong- ovate to long deltoid-ovate, nearly symmetric; sori straight, rarely curved; raches bearing no bulblets below apex.

114. Petioles and raches pale purplish red, fragile; costae densely pubescent abaxially. In Sichuan and Guizhou ····································· 113. A. **imbricatum** Christ

114. Petioles and raches stramineous, tough; costae glabrous abaxially.

115. Petioles usually longer than laminae; laminae ovate, cuspidate at apex; pinnae less than 10 pairs. In Yunnan ······ 114. A. **xichouense** Y. T. Hsieh et Z. R. Wang

115. Petioles usually shorter than laminae; laminae oblong, acuminate at apex; pinnae about 13 pairs. In Hunan ································ 115. A. **nanyueense** Ching

113. Laminae ovate to narrowly ovate, occasionally lanceolate; pinnules or lobes separate from each other; pinnules oblong-ovate, asymmetric; sori straight, curved or various in shape; raches often bearing bulblets below apex.

116. Pinnules of medial pinnae anadromic. In Taiwan, Zhejiang, Hunan, Hubei, Guangxi and Guizhou ·· 116. A. **cryptogrammoides** Hayata

116. Pinnules of medial pinnae subopposite. In Jiangsu, Zhejiang, Anhui, Fujian, Taiwan, Jiangxi, Hunan, Hubei, Guangxi, Guangdong, Sichuan, Guizhou, Yunnan and Xizang ·· 117. A. **iseanum** Ros.

(待续. To be continued)